United States Department of Agriculture

Homestead Project

Final Environmental Assessment

Forest Service St. Joe Ranger District Revised April 20, 2021

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Introduction

This environmental assessment (EA) describes the proposed Homestead project and presents an analysis of effects related to that project, consistent with 40 CFR 1500-1508. Supporting resource reports and biological assessments are incorporated in this document by reference. Additional documentation is located in the project file and cited by an assigned project file document (PF Doc.) number. A large scale map and other documents (including resource reports) are available on the project website: https://www.fs.usda.gov/project/?project=53049.

Project Area

The proposed project is located on National Forest System Lands (NFSL) near Avery, Idaho on the Idaho Panhandle National Forests (IPNF). The project area is approximately 16,757 acres, which includes 16,717 acres of National Forest System lands, in the Daveggio, Homestead, and Shearer Creek drainages, all tributaries of Marble Creek, which flows into the St. Joe River.

The project area covers National Forest System Lands in the IPNF Forest Plan Management Areas (MA) 4a Research Natural Area (approximately 306 acres), MA 5 Backcountry (approximately 1,837 acres), and MA 6 General Forest (approximately 14,570 acres) located in Shoshone County, Idaho, south of the town of Avery. The project area is located in all or portions of sections 8, 9, 13-17, 20-24, 25-29, 33-36 in T. 44 N., R. 3 E.; and sections 6-8, 17, 18, 19-21, 27-30, 31-34 in T. 44 N., R. 4 E.; and sections 1-3 in T. 43 N., R. 3 E., Boise Meridian (Figure 1).

The IPNF Land and Resource Management Plan (USFS, 2015 p. 71) describes MA 6 as having "relatively large areas with roads, trails, and structures, as well as signs of past and ongoing activities designed to actively manage the forest vegetation." The Forest Plan also states, "Many of the acres within this MA are suitable for the production of timber on a regulated basis, providing wood fiber in response to regional and national demand."

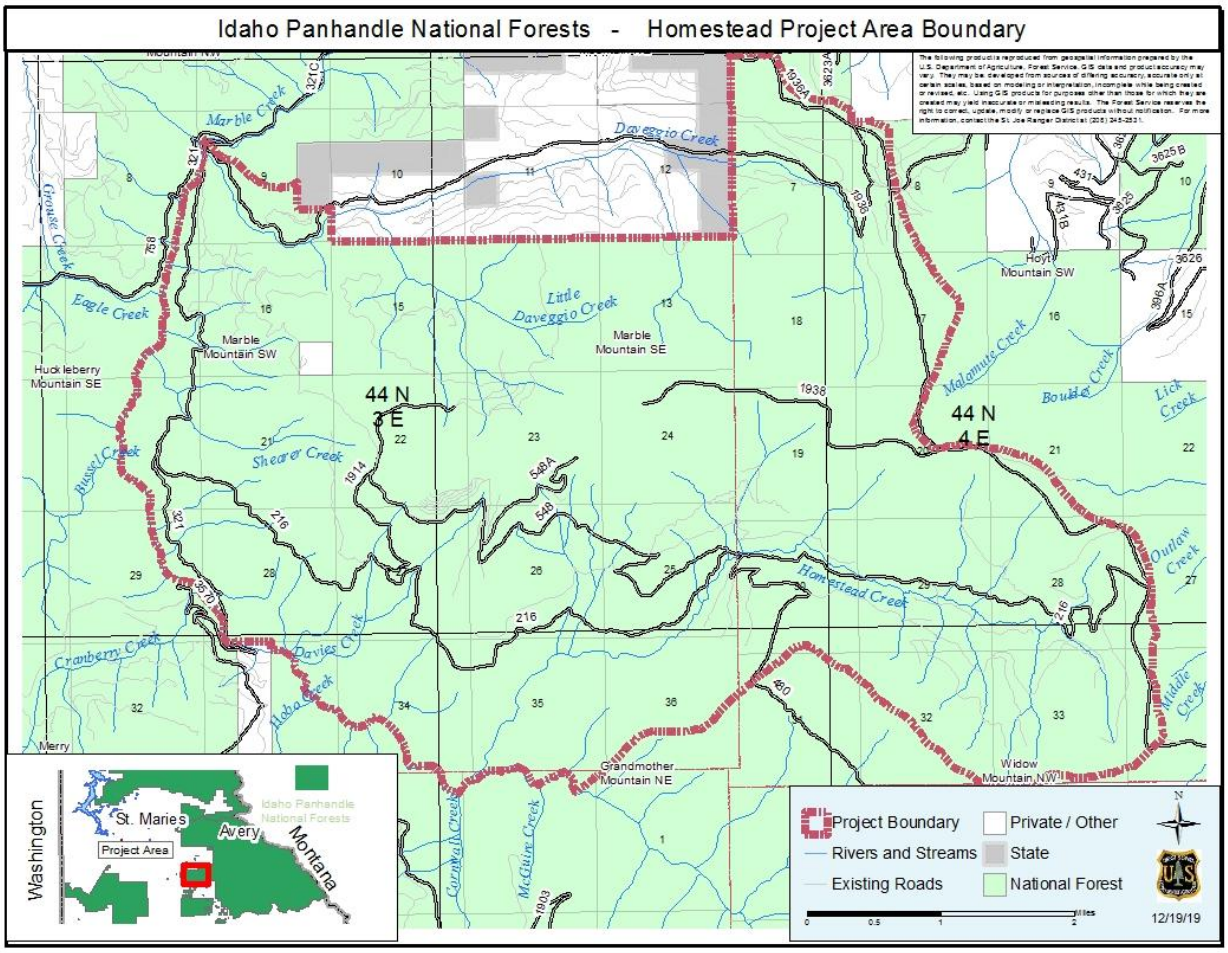

Figure 1: Homestead Project Vicinity Map

Purpose and Need for Action

Why Here, Why Now

The IPNF Forest Plan provides a framework to guide resource management with goals and objectives. Reconnaissance of Idaho Panhandle National Forest stands determined that existing conditions in some areas deviated from the desired conditions described in the Forest Plan. A long range list of successive individual projects was identified to restore those areas to trend the forest toward desired conditions. The Forest Plan Consistency Table (Appendix A) identifies how the implementation of the proposed actions in the Homestead project would help to make progress toward one or more of the desired conditions over the long term.

Existing and desired conditions in the Homestead project area indicate a need to:

- Establish and maintain resilient forest stand structure and species composition.

- Reduce the potential for high intensity wildfire while promoting desirable fire behavior and characteristics.
- Maintain or improve hydrological connectivity, water quality and aquatic species habitat.
- Contribute economic benefit to local communities and the general public by providing forest products to market.
- Update the motor vehicle use map to accurately reflect current routes.

Establish and Maintain Resilient Forest Stands

Forest composition within the Homestead project area is dominated by subalpine fir mix (52 percent) and mixed stands with grand fir, cedar and western hemlock (40 percent). Of the forested land in the Homestead project area, about 12,550 acres have a moderate root disease hazard rating (Pederson and McKeever, 2018). Root disease fungi, such as Armillaria (*Armillaria ostoyae*) and Heterobasidion (*Heterobasidion occidentale*) were observed on approximately 841 acres (69 percent) of the proposed harvest acres (PF: VEG-001). Forest Plan desired conditions for root disease fungi are that species such as Armillaria and Phellinus kill fewer trees as the composition of the forests trends toward less susceptible tree species such as western larch, ponderosa pine, and western white pine (FW-DC-VEG-06). Bark beetles, including Douglas fir beetle (*Dendroctonus pseudotsugae*) and fir engraver (*Scotlytus ventralis*) are present as is white pine blister rust, affecting western white pine and whitebark pine. These disturbance agents are causing various levels of mortality within the Homestead project area. Forest Plan desired conditions for forest insects are that insects, such as Douglas fir bark beetle, mountain and western pine beetles, fir engraver beetle, and the western spruce budworm, generally cause less tree mortality. Impacts from the non-native fungus that causes the white pine blister rust disease are reduced as the abundance of rust-resistant western white pine and whitebark pine increases (FW-DC-VEG-06).

In the Homestead project area, there is a lack of representation of shade intolerant, early seral, drought tolerant, fire resistant species dominance types that are also insect and disease resistant. Forest Plan desired conditions are that more of the forest is dominated by western white pine, ponderosa pine, western larch, and whitebark pine. Conversely, less of the forest is dominated by grand fir, western hemlock, western redcedar, Douglas fir, lodgepole pine, and subalpine fir (FW-DC-VEG-01). The proposed vegetation management activities would increase the presence of these species at the stand scale and at larger patch scales that include multiple stands. Also, there is a deficiency of early seral successional stages within the project area. Compositional diversity of the vascular plant community, including forbs, shrubs, and trees is a key attribute of early seral communities (Swanson et al. 2011). Currently, approximately 69 percent of the Homestead project area is dominated by the large tree size class (greater than or equal to 15 inches at diameter breast height) and only 2 to 3 percent is comprised of the seedling, sapling and small tree size classes (5.0 inches to 9.9 inches diameter breast height. The proposed actions are designed to affect forest vegetation at both the stand and larger patch scale in order to make effective movement towards desired conditions for species composition, size class and patch size for the warm and moist biophysical setting (FW-DC-VEG-11).

The pattern, including patch size, of successional stages within the project area is relatively homogenous due to the low diversity of vegetation composition and structure. Forested landscapes that contain little heterogeneity promote the creation of large contiguous areas susceptible to bark beetles and other forest insects (Fettig et al., 2007). Forest Plan desired conditions for the warm and moist biophysical setting are patch sizes of 100 to 300 acres in size, with large patch sizes on steep topography (FW-DC-VEG-11). Overall, the Homestead project area is outside of the desired conditions outlined in the Forest Plan for

forest composition, forest structure, patch size, and associated landscape pattern (FW-DC-VEG-01, FW-DC-VEG-02, FW-DC-VEG-11).

There is a need to manage vegetation composition and the landscape arrangement of forest structure on lands within the Homestead project area. This may be accomplished by matching the scale and extent of treatments to the scale and extent of ongoing insect and disease problems. Developing large patches over 40 acres in size of conifer species that are resistant to drought, insects, disease, and wildfire would contribute to the development of a resilient, heterogenous landscape.

Reduce the Potential for High Intensity Wildfire

The diseased, crowded, and homogenous stands in the project area create a continuous fuel bed across the landscape, with decades of accumulated dead branches and trees that generally place the area at higher risk of a large, severe fire that is difficult to control and could spread onto private lands. Reduction in fuels through thinning, removal, and burning would create openings and areas of regeneration where the risk of high wildfire intensity is reduced.

Maintain or Improve Hydrologic Connectivity and Aquatic Habitat

The Homestead project is part of the long-range goals of the Idaho Panhandle National Forests to maintain or improve existing aquatic conditions that do not meet the Forest Plan desired conditions.

Hydrologic connectivity has been compromised at some stream crossings within the project area. Surveys have identified culverts that are not allowing aquatic organism passage because they have deteriorated, are filled with sediment, or they may be undersized. The proposed project includes replacing or upgrading culverts and constructing an aquatic organism passage structures.

Marble Creek was manipulated by the construction of log splash dams in the early 1900's. These dams backed up large quantities of water and logs, which flushed outside channel habitat when released, as well as the large woody debris and the typical pool, riffle, run stream sequences needed by native fish species during various life stages. Surveys have determined that the homogenous habitat within Marble Creek does not meet the Forest Plan desired stream habitat features or condition for streams that are consistent with their natural potential.

Contribute to Local Economies

A goal of the Forest Plan (SES-01) is to contribute to the social and economic well-being of local communities by promoting sustainable use of renewable natural resources. Providing timber for commercial harvest, forage for livestock grazing, opportunities for gathering firewood, and other special forest products are ways that promote sustainable use of renewable natural resource. Permitted recreation residences, and settings for recreation are consistent with goals for watershed health, sustainable ecosystems, biodiversity, and scenic or recreation opportunities. The project would address local and regional socio-economic interests by contributing to sustainable use of natural resources and producing benefits for local communities. Outputs would help create or maintain jobs and income in the counties surrounding the Idaho Panhandle National Forests, promote stability in the local economy, and help maintain quality of life in local communities.

Enhance Motorized Recreation Access

The Forest Service provides safe and efficient public and administrative access to the Forest for recreation, special uses, forest resource management and fire management activities (FW-DC-AR-07). Motorized route changes are proposed to better reflect existing use patterns and balance resource conservation.

Public Involvement

The Forest Service mailed letters describing our proposed action and announcing an open house. A notice describing the proposed action, project website, and open house date was posted on the Idaho Panhandle National Forest website. Notices of the proposed project and open house meeting also appeared in the Coeur d Alene Press and the Saint Maries Gazette.

The Environmental Assessment will be made available for a 30-day public comment period. In addition to notifying members of the public on our mailing list, a legal notice will appear in the Coeur d'Alene Press. The comment period will be posted to the IPNF Website and the project website. A press release will also be issued.

Proposed Action

The proposed action promotes forest conditions on National Forest System lands that reduce fire hazard and improve forest landscape resiliency by creating forest composition and structure that is resistant to insects and diseases. The proposed action is also designed to reduce forest fuels and the potential impacts of wildfire, assisting with fire suppression efforts. This will also help protect resources and non-forest lands and values in and around the project area.

The activities that would occur under the proposed action are described below. Tables and figures are provided throughout this Environmental Assessment to summarize some of the actions. Furthermore, additional supporting documents, tables and maps can be found in the appendices of this document and are organized in the project file by resource area.

Vegetation Treatments

We are proposing even-aged regeneration harvest treatments on approximately 1,170 acres (Appendix C, Map C-1: Proposed Harvest Units), where more resilient and longer-lived tree species, such as western larch (*Larix occidentalis*) or western white pine (*Pinus monticola*) are a either a minor component or are non-existent within stands. Regeneration harvest treatments would include seed-tree, clearcut, and shelterwood methods, all with reserves of desired trees left on site. Reserve trees would provide seed to supplement planned plantings, future snags, some ground shading, wildlife habitat, and coarse woody debris for soil productivity. Timber harvest would occur in stands where species of trees most susceptible to root disease and insect infestations are dominant. Proposed regeneration harvests would create openings which exceed 40 acres in order to address deteriorating forest health conditions caused by root diseases and insects occurring at scales that exceed 40 acres. Commercial thinning is proposed on

approximately 49 acres (Appendix C, Map C-2: Proposed Treatment Units) where a healthy component of desired shade intolerant conifers exists. Commercial thinning would favor shade intolerant, root disease resistant species (western larch and western white pine) while retaining some of the more root disease susceptible, shade tolerant conifers (grand fir, Douglas fir). These latter conifers could contribute to future snag recruitment and down woody debris if trees within these stands were infected with root disease. No project activities would occur in old growth stands. Stands in riparian areas, wildlife buffers, and roadless areas are not proposed for timber harvest.

We are also proposing to target 202 acres for whitebark pine restoration (Appendix C, Map C-2: Proposed Treatment Units). Whitebark pine is listed as a candidate species by the US Fish and Wildlife Service and was placed on the sensitive species list for Region One by the Regional Forester (FEIS) (USFS, 2013b) The treatment activities would include low intensity prescribed burning to enhance existing openings that are adjacent to known whitebark pine habitat. This would create openings for planting and natural regeneration. Some fire hazard reduction benefits would also be gained from prescribed burning treatments, as fuel accumulations on the forest floor are expected to be consumed. Whitebark pine ecosystems are too wet to burn for much of the year, so the prescribed burning is best conducted in the fall after an early frost kills herbaceous plants and shrub foliage, which can propagate fire when cured. Existing whitebark pine in the units would be avoided or protected, as they are thin-barked and susceptible to fire kill. Blister-rust resistant seedlings could then be planted following prescribed burning treatments.

Decades of wildfire suppression and mountain pine beetle have taken a toll on the white bark pine. However, the primary cause in their decline is from the presence of white pine blister rust, an invasive fungal disease.

Reforestation

After harvest, fuel reduction, and site preparation activities are completed, western larch and blister rust-resistant white pine would be planted in combinations appropriate for individual stands. Douglas fir (*Pseudotsuga menziesii*) and western red cedar (*Thuja plicata*) may be included in the planting mix where appropriate. Reforesting with native tree species would hasten and enhance the overall recovery process, meet restoration objectives, and trend the vegetation component toward desired future conditions. Where pocket gopher populations cause severe damage to seedlings, gopher abatement activities would occur.

Planting would be designed to meet requirements to adequately restock harvested lands within five years after final harvest.

How Trees Would Be Removed (Logging Systems)

Where trees to be removed have commercial value, we would require the use various types of equipment based on the terrain and access constraints. Skyline yarding would be used on steep terrain (Figure 2). Tractor yarding would be used on flat to gentle slopes, and a combination of skyline and tractor yarding would be used where slopes vary. See Table 1~~Table 1~~ for the proposed logging systems by acres in the Homestead project area, a map in Appendix C identifies logging systems by unit (Appendix C, Map C-3: Homestead Logging Systems).

Table 1: Proposed Logging Systems in the Homestead Proposed Action

Logging System Type	Proposed Action (acres)
Off Road Skyline	88
Skyline	213
Ground Based	918
Total	**1219**

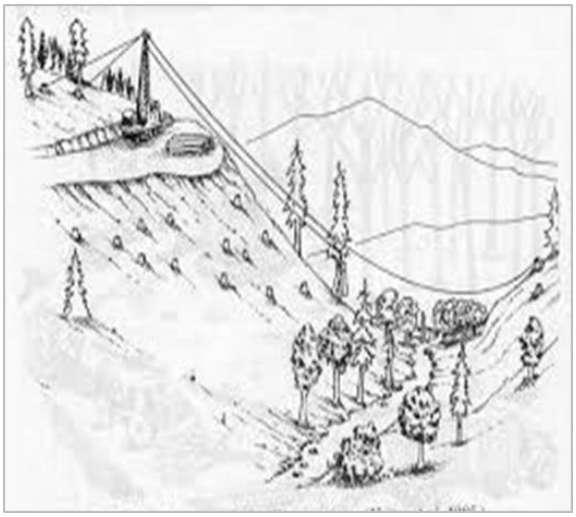

Figure 2: Illustration of a Skyline Yarding System

Fuel Reduction Activities

The proposed action includes creating large openings to promote forest conditions that reduce the risk of wildfire to National Forest System lands. The larger the openings, the more effective treatment areas are for suppression resources to engage the fire safely under severe conditions. Regeneration harvest of units greater than 40 acres in size creates more slash in the short term, but design features and compliance with the Idaho Forest Practices Act would hasten treatment of the slash, resulting in larger openings with less fuel available to wildfire. These larger harvest units would not only create fuel breaks, but also promote the growth of trees that are more resistant to fire in the longer term.

Where burning is proposed, design features would ensure attention to smoke management, including coordination with the Montana and Idaho Airshed Group. In addition to burning when dispersion is good, smoke management techniques would include construction of slash piles free of stumps and soil, and conducting burning in conditions as dry as are practical to enhance combustion.

Surface fuels and canopy densities would be reduced on over 1,200 acres using the treatments shown in Table 2, creating a lower intensity and lower severity fire environment These treatments would follow commercial harvest activities.

Table 2: Proposed Fuels Reduction Activities

Post Harvest and Vegetation Treatment/Activity	Proposed Acres
Grapple pile and burn	879
Broadcast Burn	220
Jackpot Burn	120
Total Vegetation Treatments	1219

Debris left from logging activities would be treated through prescribed burning, machine piling, whole-tree yarding, or a combination of these treatment options. Broadcast burning and jackpot burning are forms of under burning in stands where activity fuels are targeted either across the unit (broadcast) or in areas of concentration (jackpot), while a mature overstory composed of desirable species is maintained. In some cases, the intent is also to eliminate advanced regeneration of shade tolerant species to create a viable setting for the white pine, western larch, and other species as determined by site conditions.

Maintain or Improve Water Quality and Aquatic Habitat

Proposed aquatic habitat restoration in Marble Creek is intended to improve water temperature concerns by adding structures to create shading, pool scour to add depth, and channel narrowing to improve overhead vegetative cover. Specific projects include replacing a culvert that is a barrier to fish migration (which will meet Forest Plan desired condition for connectivity), mitigating sediment delivery to streams from project areas roads though storing or decommissioning, and hardening road-stream crossings. These activities will increase protection of water quality resources in the project area.

Transportation System Management

A travel analysis process (PF: TRAN-002) was conducted to determine a transportation system for the project. To facilitate the proposed timber harvest, new system and temporary roads would be constructed, existing stored system roads would be reconstructed, and some non-system road segments would be added to the National Forest System road inventory. (Non-system road roads are on the landscape, but are not maintained or classified as Forest Service roads.) After project activities, some road segments would be decommissioned (removed from the National Forest Road System), and others would remain in the system but be stored for future use (Appendix C, Map C-4: Homestead Unit Roads). General road maintenance would also occur on all existing open roads used for project activities. See Appendix B for tables that list specific road segments. The proposed actions are consistent with the Idaho Roadless Rule.

Table 3: Road Management Activities in the Homestead Proposed Action

Road Management Activities	Proposed Miles[1]

[1] The values in this table may differ from other sources in this document to include map products as a result of different methods used to calculate the data such as the use of two dimensional data versus three dimensional data. The values throughout the document may have been developed from different sources with different levels of accuracy and may have been based on modeling or interpretation.

New road construction	4.1
Non-system roads to be added to the NFS	14.9
Temporary road construction	2.9
Road reconstruction	5.9
Road maintenance	27
Road decommissioning	34.4
Road storage	12.2

New Road Construction

Approximately four miles of new road construction would occur with four new roads to facilitate the safe and efficient haul of logs from the proposed treatment areas. After planting is complete in the harvest units, the roads would be hydrologically stabilized and stored for future administrative use. Roads placed in storage would no longer be drivable.

In addition, approximately 14.9 miles of non-system road segments in the project area would be used for the project and then added to the National Forest Transportation System. Of these segments, one would remain open, three would be stored for future use, and two would be closed with a gate or front-end obliteration.

Temporary Roads

Approximately three miles of temporary roads would be constructed to access treatment units. Temporary roads and landings would generally be located on dry ridgetops and designed to standards appropriate for the intended use. These standards consider safety, cost of transportation, and the potential to impact resources[2] while making progress toward achieving Forest Plan desired conditions (FW-DC-AR-07).

At the completion of the project, temporary roads would be decompacted, recontoured to the approximate shape of the surrounding terrain, and seeded or covered with logging slash or other debris to prevent erosion and to accelerate hydrologic and vegetative recovery.

System Road Reconstruction

Approximately six miles of existing stored roads would be reconstructed to a standard suitable for safe and efficient hauling of timber and would meet current Idaho forest practices standards for water quality. Reconstruction activities would include brushing, short stretches of realignment, road widening, the addition of turnouts, and improvement or addition of drainage structures.

[2] 16 U.S. Code 1608(b) and (c)

Road Maintenance

Approximately 27 miles of road maintenance would occur to facilitate the safe and efficient haul of logs from the proposed treatment areas. Maintenance activities would include clearing brush from the road shoulders to improve sight distance, blading and shaping the road, cleaning ditches and culverts, improving drainage structures, and adding gravel to road surfaces. Spot reconstruction would be necessary to address drainage or safety issues on portions of some roads proposed for maintenance.

Road Storage

Following vegetation management and fuel reduction activities, about 12 miles of administrative roads would be put into long term storage. Roads placed in storage would no longer be drivable. They would be blocked with a gate or earthen berm, or have a short section of full recontouring to match the original slope of the land. High risk culverts or drainage structures that are causing appreciable sedimentation would be removed to make the road prisms hydrologically inert.[3] Potentially unstable slopes would be recontoured, running surfaces would be ripped to encourage water infiltration, revegetation cross ditches would be installed, large woody debris would be placed, and exposed soils would be revegetated. Stored roads would remain as part of the National Forest Transportation System and would be reopened as needed in the future.

Road Decommissioning

Approximately 34 miles of non-system (undetermined roads) would be decommissioned. These are generally old skid trails or brushed-in spurs that are mostly impassable and do not provide legal public access. Roads are decommissioned when they are no longer needed for future management activities. Decommissioning roads reduces road maintenance costs and improves wildlife security. As with road storage, decommissioning would remove any resource risks associated with these routes (such as failing culverts or potential erosion), and the road entrance would be made impassable to discourage illegal use where applicable.

Changes to Motorized Public Access

Only roads designated on the current St. Joe Ranger District Motor Vehicle Use Map (MVUM) are open to public motorized use. Within the project area there are currently 39.8 miles of road designated on the MVUM as open to public motorized use and an additional 7.6 miles of trails open to public motorized recreation. There are many roads within the project area which are not currently open for public motorized access. Changes are proposed to better reflect existing use patterns and balance resource conservation. The proposed action would result in 36.8 miles of open road and 7.6 miles of open motorized trail. See project file REC-003 for a map of changes.

[3] A road that is hydrologically inert is a road that no longer concentrates water, has measurably improved infiltration (reduced compaction) and poses little or no risk for future erosion or mass failures.

Table 4: Proposed changes to the MVUM in the Homestead Proposed Action

Route Types	Current Conditions in miles	Proposed Action in miles	Route Changes in the Proposed Action (additions)	Routes Changes in the Proposed Action (removals)
Roads	39.8	36.8	216A (0.26 mi, Breezy Pt.)	548 (3.3 mi, Davies Creek 548 A (0.7 mi, Davies Creek Spur)
Motorized Trails	7.5	7.6	548 UA (1.1 mi) 548 UE (0.2 mi)	1936 B (1.1 mi, Daveggio Meadow OHV)

Quarry Rock and Stockpile Areas

The Homestead project will require both road maintenance and new road construction. Both of these activities will require the use of gravel to stabilize the roads and provide an enduring wear surface to stand up to heavy truck haul. An existing rock quarry is located on National Forest lands on Forest Service Road 321, approximately eight miles from the intersection with FH 50 (Appendix C, Map C-5: Quarry and Stockpile). This quarry will remain active for an unknown period of time while incorporating all Best Management Practices. Rock will be quarried and crushed on site and trucked to one of three stockpile locations.

The stockpile locations have previously been used for landings, dispersed camping, and other administrative uses. Trees will be commercially harvested as needed to increase the storage area of the stockpile locations. All Best Management Practices will be incorporated to minimize disturbance to the area, including soil disturbance and sediment migration. All three locations are relatively flat so minimal mechanized ground disturbance will be needed. There will be approximately 30,000 cubic yards of rock stored for the Homestead road treatments between the 3 locations (Appendix C, Map C-5).

- Location 1 is on FS road 321, approximately 10.8 miles from the intersection with FH 50. The site has a current opening size of 0.70 acres that will be expanded to 1.72 acres.

- Location 2 is on FS road 321, approximately 11.4 miles from the intersection with FH 50. The site has a current opening size of 0.31 acres that will be expanded to 0.60 acres.

- Location 3 is on FS road 321, approximately 12.6 miles from the intersection with FH 50. The site has a current opening size of 0.20 acres that will be expanded to 1.64 acres.

At the end of the project, the stockpile locations may be used as disbursed camping sites, firefighting staging areas, or reused as decking areas for future logging operations.

Design Features to Protect Resources

Design features are activities that will be implemented throughout the project to avoid or mitigate potential project related impacts. In addition, the project has been designed to comply with Forest Plan standards and guidelines that help minimize impacts to specific resources. See Appendix D for a complete list of design features by resource.

Alternatives Considered but Eliminated

Federal agencies are required by NEPA to evaluate all reasonable alternatives to the proposed action, and to briefly discuss the reasons for eliminating those alternatives that were not studied in detail (40 CFR 1502.14). Alternatives not considered in detail may include, but are not limited to, those that fail to meet the purpose and need, are technologically infeasible or illegal, or those that would result in unreasonable environmental harm. The following alternatives were considered but eliminated from detailed analysis.

Limit Forest Openings to 40 acres or Less Alternative

This action alternative analyzes in detail the effects of including even-aged regeneration harvest treatments that would create forest openings larger than 40 acres in size (Appendix C, Map C-6, Homestead Openings Greater Than 40 Acres). For this project, we are seeking approval from the Regional Forester to create forest openings that exceed that size. An alternative was initially considered to limit the size of potential openings to 40 acres or less. This alternative was proposed by the interdisciplinary team as a way to help determine if project goals and objectives could be achieved without exceeding the opening size restriction. This alternative was eliminated from detailed analysis because limiting openings to less than 40 acres would clearly not allow the realization of project goals related to forest patch size and pattern, hazardous fuels, and addressing insect and disease hazard (pages 20, 26). It would not appropriately or effectively address the scale of current insect and disease hazard levels, create ecologically desirable patterns of early seral structure, or provide persistent, effective relief from wildfire threat.

Thinning in the Riparian Areas

In the American Forest Resource Council (AFRC) comment letter (PF: PI-001), they encouraged the Forest Service to incorporate thinning in riparian areas to provide real benefits to wildlife and stream health. Thinning in riparian areas was initially included in the proposed action. Riparian areas within MA-6 in the project area were surveyed to identify opportunities to create canopy gaps. Through field surveys, it was determined that little opportunity existed to provide canopy gaps that would increase herbaceous vegetation.

Intermediate or “Thinning Only” Treatments

Intermediate harvest would not be effective in the Homestead project area because it would exacerbate root disease effects (through buildup in the stumps and root systems of the fungi that cause root disease), lead to heavy blowdown, and encourage advanced regeneration of grand fir and Douglas fir (page 22).

Additional Prescribed Fire in Natural Fuels

Areas of commercial timber suitability, as well as the Theriault RNA, were removed from consideration when looking for additional opportunities to introduce prescribed fire into natural fuels in the project area (PF: FF-003). Outside of these areas, species composition consists mostly of mountain hemlock, Engelmann spruce, and subalpine fir. These species are not well adapted to fire and are often killed by surface fires. They are also prone to crown scorching due to low hanging branches, foliage flammability, and because they grow in dense groups. This species composition is a primary limiting factor to successfully meeting objectives of the project with prescribed fire treatments. Some additional treatment is being planned in the Fishhook Peak area to enhance whitebark pine habitat. There is a very short burn window for natural fuels here, with snow and wet conditions persisting into July.

More Commercial Harvest

In the American Forest Resource Council (AFRC) comment letter, it was suggested that more acres should be treated with commercial harvest to better accomplish the need for treatment, and to improve the economic efficiency of the project. Although, 87 percent of the National Forest lands in project area (14,570 acres) is designated as MA-6, not all of this acreage met criteria for timber harvest. The proposed action will treat about 1,170 acres of the potentially available land in MA-6. Table 5 identifies the retention types and number of acres that have been excluded from project activities.

Table 5: Type of Retention with Acres in the Homestead Project Area

Type of Retention	Total Acres*
Relatively Recent Harvest	1,563
High Mass Failure Zones (HMF)	1,834
Elk Security Acres	1442
Increased Elk Security	114
Riparian Habitat Conservation Area (RHCA)	3,597
Old Growth	5,566
Past Pruning	419
Roadless	1,888
Research Natural Areas	306
Recent Fire Activity	688
Private Land	39

***Total number of acres exceed that of the project area due to an overlap of retention type acres**

Homestead Retention Map (Appendix C, Map C-7) identifies the retention areas in relation to the harvest areas and illustrates the overlap of retention area types.

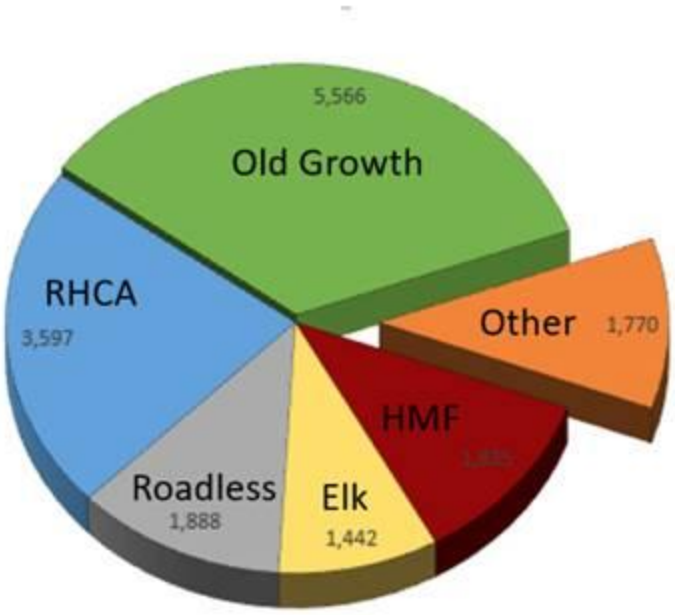

Figure 3: Retention Types over 1000 Acres

Environmental Effects

Introduction

The resource areas analyzed are those that are likely to be measurably affected by the proposed action in some way. Resources that would not be affected because they will be completely protected or avoided are not discussed here. Further information about resources not discussed and more detailed reports of all resources analyzed are available in the project record.

Forest Vegetation

Summary

The proposed action would trend the Homestead project area toward the desired conditions for forest vegetation outlined in the Forest Plan. There would be an increase in representation of early seral, shade intolerant, drought and fire tolerant, insect-and-disease-resistant tree species (for example, western larch, blister-rust resistant western white pine and whitebark pine). Planting activities would increase forest resistance and resiliency to future disturbance and stressors including wildfire, insects and disease, and climate uncertainty. The seedling and sapling size class would increase in acreage and would be brought within the desired range identified in the Forest Plan. The large class would move to closer to the upper limit of the desired range and the medium size class would remain within the desired range. There would

be no treatments in old growth. The proposed action would create up to seven openings in excess of 40 acres (Appendix C, Map C-6: Openings Over 40 Acres).

Issues Addressed

This section includes issues pertaining to forest vegetation that have been identified for detailed analysis. "An issue is a statement of cause and effect linking environmental effects to actions" (Forest Service Handbook 1909.15).

- Forest cover types: representation of early seral species across the landscape
- Forest structure: size class distribution across the landscape
- Management created openings greater than 40 acres
- Existing old growth

Methodology

Vegetation analysis used data collected in the field, a 2016 Region 1 (R1) existing vegetation map (VMap), 2017 National Agriculture Imagery Program (NAIP) imagery, and ArcMap Geographical Information System (GIS). For detailed information on the methodology, see PF:VEG-001.

Resource Indicators and Measures

Resilient landscapes maintain a dynamic range of species, vegetation patterns, and patch size distributions that emerge under the constraints of the climate, geology, disturbance regimes, and biota of the area (Stine et al. 2014). Indicators and measures for assessing effects to forest vegetation are discussed below and are displayed in Table 6. These measurement indicators are based on quantifiable attributes that can be measured pre- and post-treatment to indicate how well desired conditions have been met.

Table 6: Forest Vegetation Condition Indicators and Measures in the Homestead Proposed Action

Issue	Indicator or Measure	Forest Plan Source
There is a lack of representation of early seral species across the landscape	Acres: Number, proportion, and patch metrics of dominance types.	GOAL-VEG-01, FW-DC-VEG-01, FW-DC-VEG-04, FW-DC-VEG-06, FW-OBJ-VEG-01, FW-GDL-VEG-08
There is a deficiency of heterogeneity of forest structure, size class and distribution.	Acres: Number, proportion, and patch metrics of forest structure by size class.	GOAL-VEG-01, FW-DC-VEG-02, FW-DC-VEG-04, FW-DC-VEG-05, FW-DC-VEG-11, FW-OBJ-VEG-01, FW-GDL-VEG-08
There has been a homogenization and simplification of landscape pattern.	Acres: Number of new openings exceeding 40 acres and patch metrics of forest structure and dominance types	FW-DC-VEG-05, FW-STD-TBR-02

Old Growth	Acres: Number and proportion and patch size of existing old growth	FW-DC-VEG-03,FW-STD-VEG-01 , FW-GDL-VEG-01 , FW-GDL-VEG-02

Spatial and Temporal Context

The spatial analysis area used to develop the existing forest vegetative conditions and to assess direct, indirect, and cumulative effects to forested vegetation includes portions of the Upper, Middle, and Lower Marble Creek sub-watersheds. The project area was used for all measures because it is large enough to assess effects to forest vegetation on the landscape at the mid-scale and fine scale.

For the purpose of the vegetation analysis, the temporal bounds include a short term timeframe of less than 5 years and a long term time frame of 80 to 90 years. The short term timeframe allows for assessment of proposed treatments post-treatment. Short term effects can usually be observed immediately after treatment has been implemented. The long term timeframe allows for an assessment of tree establishment post-harvest, stand growth over time, and potential future treatment needs (for example, precommercial thinning).

Forest Cover Types

Change in forest cover types is measured by the acres and proportion of dominance groups at the biophysical setting scale and the project scale. Per the definition in the Forest Plan, a dominance group is defined by the following:

- Single species – species that make up at least 60 percent of the canopy cover or weighted basal area.
- Species mix – No single species determination can be made. The type of mix, either tolerant or intolerant, is determined by what species combination makes up 80 percent of the canopy cover or weighted basal area, with each species contributing more than 20 percent to the total.

Currently, the acreage of stands dominated by early seral species (for example, western larch and western white pine) is well below the desired condition. A primary goal of the Homestead project is to increase the proportion of western larch, western white pine, and whitebark pine. Activities which maintain and increase the presence of these species would increase species heterogeneity in the project area, improve the health of the forested ecosystem, and increase resilience to disturbances such as wildfire, insects and disease, and drought. Cover type patch metrics are discussed later to evaluate the arrangement of dominance groups on the landscape.

Forest Structure

The Idaho Panhandle National Forest (IPNF) uses four size classes to broadly describe and quantify stand structure. Stand structure is the horizontal and vertical distribution of a forest stand including the height, diameter, crown layers, and stems of trees, snags, and down woody debris (Deal, 2018). This analysis measures forest structure at the biophysical setting scale and project scale. Under the IPNF Forest Plan, size class is based on basal area weighted diameter of the plot or stand. Weighted diameter is calculated, and then classification is made as follows according to the weighted diameter or diameter at breast height (DBH)

1. Seedling and saplings: 0.0 to 4.9 inches DBH
2. Small: 5.0 to 9.9 inches DBH
3. Medium: 10.0 to 14.9 inches DBH
4. Large: Greater than or equal to 15.0 inches DBH

Openings Larger than 40 acres

The proposed action would generate openings in excess of 40 acres. The Forest Service is required to disclose to the public if individual harvest openings created by even aged silvicultural practices are proposed that would exceed 40 acres, and to seek Regional Forester approval for the larger openings. For the Homestead project, approval from the Regional Forester is pending at this time. See page 26 for additional discussion of over 40-acre openings.

Old Growth

Effects to old growth are measured by the proportion and acres of the project area allocated as old growth, consistent with Green et al. (2011) definitions and the minimum, maximum, and mean patch size of allocated old growth patches within the project area. No project activities are planned in old growth stands. See page 27 for additional discussion of old growth.

Effects to Forest Vegetation

Direct and Indirect Effects

Forest Cover

Approximately 58 percent of the project area is classified as the subalpine biophysical setting and 40 percent is classified as the warm and moist biophysical setting. About 86 percent of the proposed treatments would occur in the warm and moist biophysical setting and 14 percent would occur in the subalpine biophysical setting. Table 7 displays the desired future conditions for forest cover types in the warm and moist biophysical setting at the Forest wide scale in comparison to the existing forest cover types at the project scale. As can be seen in Table 7, the grand fir, western red cedar and western hemlock (GF/C/WH) mix is dominant within the warm and moist biophysical setting, consisting of 91 percent. There is an abundance of the two most susceptible hosts of Armillaria root disease, Douglas fir and grand fir, within the project area (Pederson and McKeever, 2018). Douglas fir can be found as a species component in forest cover types in the GF/C/WH mix dominance group and as scattered representation in the other dominance groups. No stands within the project area are dominated by western white pine. The shade intolerant mix (IMIX) is primarily comprised of western larch and Douglas fir, with scattered western white pine and minor amounts of grand fir and western red cedar. Scattered whitebark pine is present at higher elevations in the subalpine biophysical setting. Whitebark pine is a tree species that is grouped with other species (subalpine fir, Engelmann spruce, mountain hemlock, and subalpine larch) to form the subalpine fir mix dominance group (USDA, 2013b).

Less than 8 percent of the project area is dominated by shade intolerant species dominance types. There is a lack of representation of shade intolerant dominance groups within the project area. The species that are expected to decrease are relatively drought and fire intolerant. Changing the forest composition towards

the desired ranges would increase resistance and resiliency, and reduce effects from drought, fire, insects, disease, and climate change (McKenzie et al., 2009).

Table 7: Pre and Post Treatment Acres and Proportions of Dominance Groups on Sites Classified as Warm/Moist Biophysical Setting in the Homestead Project Area

Dominance Group	Existing Acres	Existing Percent	Desired Range (Percent)	Post-Treatment Acres	Post-Treatment Percent
GF/C/WH	6,113	91	10-20	4,918	73
DF	228	3	14-28	228	3
WL	41	1	12-25	1,211	18
WWP	0	0	30-60	0	0
LP	89	1	N/A	84	1
IMIX	210	3	N/A	240	4
SF mix	29	<1	N/A	29	<1
Non-forested	20	<1	N/A	20	<1
Total	6,730	100		6,730	100

***GF/C/WH= grand fir/cedar/western hemlock mix, DF= Douglas fir, WL=western larch, WWP=western white pine, LP=lodgepole pine, IMIX=shade intolerant mix, SF mix=subalpine fir mix**

The proposed action is intended to establish new stands of long lived, early seral, shade intolerant species on approximately 1,170 acres. Stands regenerated under the proposed action would be planted with a mix of western larch and rust resistant western white pine. Proportions of western larch and western white pine planted would vary depending on pre-planting surveys, habitat types, and site conditions. Therefore, stands post-treatment may be planted such that the dominance group could be classified as western white pine, which is not reflected in Table 7. For this analysis, stands were evaluated with a higher proportion of western larch, categorizing them in the western larch dominance group. Pocket gopher control would be utilized if pre-planting inspection or first-, third-, or fifth-year survival surveys indicate that gopher related herbivory has caused a need. Within seed-tree and shelterwood regeneration units, natural regeneration is expected due to residual seed and shelter trees of western larch, and to a lesser degree, western white pine to supplement planted trees. Existing snags which meet minimum snag requirements and do not pose a safety concern would be retained.

Commercial thinning, an intermediate treatment, would occur on 49 acres in stands currently within the grand fir, western red cedar and western hemlock (GF/C/WH) dominance group. Intermediate harvest as a primary treatment activity would not be effective in the Homestead project area because it would exacerbate root disease effects (through the buildup in the stumps and root systems of the fungi that cause root disease), lead to heavy blowdown, and encourage advanced regeneration of grand fir and Douglas fir. Where commercial thing is proposed (less than 0.3 percent of the project area, and 4 percent of harvest acres), there is already a healthy component of the desired shade tolerant conifers. Commercial thinning would favor these more root disease-resistant species (western larch and western white pine) while retaining some shade tolerant, root disease susceptible conifers. The retained shade tolerant conifers could contribute to snag recruitment and down woody debris if these stands were infected with root disease.

Approximately 202 acres in the subalpine biophysical setting would be treated to restore whitebark pine. These treatment acres would not include any commercial tree harvest. Prescribed fire would be the primary tool used to reduce the presence of competing vegetation and prepare sites for planting of rust resistant whitebark pine. Hand thinning would be incorporated as a protection measure around existing whitebark pine to minimize damage or potential loss.

The proposed action would increase the amount of shade intolerant western larch, western white pine, and whitebark pine within the project area. As depicted in Table 8, the amount of the warm and moist biophysical setting classified as the grand fir, western red cedar and western hemlock (GF/C/WH) mix would decrease by 1,195 acres, via 1,146 acres of regeneration harvests and 49 acres of commercial thinning. Lodgepole pine would decrease by about 5 acres and the shade intolerant mix (IMIX) would decrease by approximately 19 acres.

Table 8: Change in Dominance Group Under the Proposed Action in the Warm/Moist Biophysical Setting in the Homestead Project Area

Treatment Type	Existing Dominance Group	Acres Treated	Post-Treatment Dominance Group
Regeneration Harvests	GF/C/WH	1,146	WL
	IMIX	19	WL
	LP	5	WL
Total		**1,170**	
Commercial Thin	GF/C/WH	49	IMIX
Overall Total		**1,219**	

Regeneration methods include: clearcut, seed-tree, shelterwood

The amount of western larch dominated acres would increase by 1,170, to within the desired range (Table 7). Planting within regeneration harvests would include a western larch and rust-resistant western white pine mix. Commercial thinning would favor western larch and healthy western white pine and reduce grand fir and the western red cedar and Douglas fir component. Commercial thinning would transition these acres to a shade intolerant mix of species. There would be greater opportunity to retain existing snags within commercial thin units and incorporate them into the residual stand structure. The shade intolerant mix would initially decrease by 19 acres, due to shelterwood regeneration harvests favoring dominant western larch and healthy western white pine as leave trees. Overall, the shade intolerant mix would increase by 30 acres due to commercial thinning. Small inclusions of lodgepole pine in regeneration harvest treatments would cause a slight decrease in its representation in the project area. Whitebark pine restoration treatments would not cause these acres to shift to a new dominance group.

The proposed action would increase heterogeneity associated with forest cover patch metrics. Management activities would create openings larger than 40 acres. Harvesting large patches of the the grand fir, western red cedar and western hemlock (GF/C/WH) dominance type and converting them to early seral shade intolerant conifers would increase the number of patches classified as western larch. The mean and maximum patch size of western larch would immediately increase relative to the existing condition (Table 9~~Table 9~~~~Table 9~~).

Table 9: Estimated Pre and Post Treatment Patch Metrics for Forest Cover Types in the Warm/Moist Biophysical Setting in the Homestead Project Area

Dominance Group	Existing Number of Patches	Existing Mean Patch Size (acres)	Existing Maximum Patch Size (acres)	Number of Patches Post-Treatment	Mean Patch Size Post-Treatment (acres)	Maximum Patch Size Post-Treatment (acres)
GF/C/WH	2	3,057	5,911	11	445	2,261
DF	13	18	118	13	18	118
WL	1	41	41	18	68	289
WWP	0	0	0	0	0	0
LP	9	10	48	9	9	48
IMIX	8	26	108	11	22	108
SF mix	2	14	17	2	14	17

The proposed action would diversify extensive homogenous patches of forests dominated by species that are very susceptible to disturbance agents. The number of patches of the grand fir, western red cedar and western hemlock (GF/C/WH) dominance group would increase. The mean and maximum size for this dominance group would decrease. The mean patch size of Lodgepole pine would decrease slightly, since small portions of existing stands would be harvested and planted with a mix of western larch and western white pine. Since portions of existing stands classified as shade intolerant (IMIX) are proposed for regeneration, the number of IMIX patches would slightly increase while the mean patch size would decrease somewhat. No stands classified as Douglas fir or subalpine mix in the warm and moist biophysical setting would be treated. Therefore, there is no change to their respective patch metrics.

Overall, the proposed action would the increase relative representation of early seral, shade intolerant, drought and fire tolerant insect, and disease species dominance types (for example, white pine, western larch, and whitebark pine). Planting would directly transition harvested acres to the western larch dominance type with western white pine as a minor component. Changing species composition from late-seral to early seral species would increase resilience to insects and disease (Jain and Graham, 2007). Proposed treatments would effectively begin to increase the amount of western larch and western white pine within the project area, trending the area towards desired conditions. However, gopher abatement may be required to ensure successful regeneration and establishment in some portions of the proposed regeneration harvest units. It is anticipated that over the short term, natural regeneration would further influence species composition. There would be additional western larch and western white pine natural regeneration to supplement planted acres due to residual seed and shelter trees. Also, it is expected that there would be some regeneration of grand fir and western red cedar in addition to Douglas fir, due to the proximity of stands dominated by these species. Stands may transition into mixed stands over time where western larch is a component, when other species have become established and share presence. The proposed action would trend the forest composition in a direction consistent with the Forest wide desired conditions and those for the warm and moist biophysical setting (Appendix A, Table A-1: Consistency with Forest Plan).

Forest Structure

Under the proposed action, size classes within the Homestead project area would shift towards the desired condition, at the biophysical setting level (Table 10) and at the project level (PF:VEG-001) as described in the Forest Plan.

Table 10: Existing and Post Treatment Size Class Distribution within the Warm/Moist Biophysical Setting in the Homestead Project Area.

Size Class	Existing Acres	Existing Percent	Desired Range (Percent)	Post Treatment Acres	Post Treatment Percent
Large (≥15.0" DBH)	5,175	76	31-61	4,187	62
Medium (10.0" – 14.9" DBH)	1,398	21	15-25	1,228	18
Small (5.0" – 9.9" DBH)	137	2	8-16	125	2
Seedling/Sapling	0	0	15-29	1,170	18
Non-forested	20	<1	N/A	20	<1
Total	6,730	100		6,730	100

Regeneration harvests (1,170 acres) would substantially increase the seedling and sapling size class, which is not represented at the stand level, to within the desired range. The large size class would see a correlated decrease in acres and be close to the upper limit of the desired range post treatment. The medium size class would see a slight decrease and remain within the desired range. The small size class would decrease slightly where proposed treatments include portions of stands where the general size of trees is at the upper end of the size class (7.0 inches to 9.9 inches diameter breast height). The proposed action would increase heterogeneity in the project area by increasing the amount of early seral successional stages. Those areas where commercial thinning is proposed would not see an immediate shift to the next larger size class.

Within regeneration harvests, various levels of reserve trees would be left. In addition to the retention of individual trees (seed and shelter trees), reserve trees would be retained centered on existing large trees, snags, seeps, and other unique structural or habitat features, creating reserve areas. These reserve areas would contribute to future snag recruitment and increased coarse woody debris. It is desirable that reserve trees are comprised of species that tend to be most persistent, such as western larch and cedar. Additionally, tree retention would be utilized to fulfill Scenic Integrity Objectives (SIOs). The retention of individual trees and groups of trees would contribute to structural (vertical and horizontal) heterogeneity. Also, the change in structure would modify wildfire behavior by reducing canopy density and horizontal

and vertical fuel continuity relative to existing stand structure (see page 42, Fire and Fuels Summary). Existing snags which meet minimum snag requirements and do not pose a safety concern would be retained. At a minimum, trees would be retained in order to meet Forest Plan snag retention recruitment guidelines (FW-GDL-VEG-04 and FW-GDL-VEG-05).

The potential retention of shade tolerant conifers in reserve areas may contribute to natural regeneration of these conifers over time as stands become more developed. Over the next 10 to 20 years, seedlings would transition into sapling size trees, and eventually into the small size class after approximately 35 years. Commercial thinning would decrease competition for limited resources and increase the vigor of residual trees. These stands would transition into the next size class sooner than without treatments.

There would be increased heterogeneity in size class patch metrics. Table 11 displays the existing and estimated post-treatment patch metrics for size classes in the warm and moist biophysical setting. The number of patches and the mean and maximum patch sizes of the seedling and sapling size class would all increase. The large and medium size classes would see an increase in the number of patches, and a decrease in mean and maximum patch sizes as a result of the proposed action. The proposed whitebark pine treatments would contribute to an increase in the seedling and sapling size class in the project area.

The proposed action would result in large, distinguishable patches, with residual structural diversity due to the retention of seed, shelter, and reserve trees. Proposed treatments would trend the forest structure in a direction consistent with the desired conditions for the warm and moist biophysical setting.

Table 11: Comparison of Existing and Estimated Post Treatment Patch Metrics for Size Classes in the Warm/Moist Biophysical Setting under the Proposed Action

Size Class	Existing Number of Patches	Existing Mean Patch Sizes (acres)	Existing Maximum Patch Size (acres)	Number of Patches Post-Treatment	Mean Patch Size Post-Treatment (acres)	Maximum Patch Size Post-Treatment (acres)
Large (≥15.0” DBH)	2	2,587	4,743	8	521	1,665
Medium (10.0” – 14.9” DBH)	21	66	478	31	40	478
Small (5.0” – 9.9” DBH)	12	11	23	12	8	23
Seedling/Sapling	0	0	0	17	70	289

Opening Size

Timber harvesting under the proposed action would generate 7 total openings greater than 40 acres in the warm and moist biophysical setting. These openings represent early successional stages in stand development. Table 12 displays the patches greater than 40 acres created under the proposed action. Forest Service Policy (FSM 2471.1) normally directs land managers to limit the size of harvest openings created by even aged regeneration methods to 40 acres or less. However, exceptions to the 40 acre opening limitation are allowable with Regional Forester approval.

The desired condition for the warm and moist biophysical setting includes patch sizes that range from 100 to 300 acres in size. For the subalpine biophysical setting, patch sizes generally range from 50 to 2,500 acres in size. Openings which exceed 40 acres in size would allow for the reduction of root disease hazard by matching the scale and spatial extent of the existing condition. Currently, 76 percent of the project area is rated to have moderate root disease hazard (Pederson and McKeever, 2018), and approximately 69 percent (841 acres) of proposed treatment areas have various levels of observed root disease infection (PF:VEG-001). Openings greater than 40 acres in size would promote a mosaic of species diversity and increase early seral species representation within the project area, reducing those species most susceptible to root disease. Also, larger openings would allow treatment unit boundaries to follow existing vegetation patterns and breaks. Openings of various sizes would increase heterogeneity associated with the pattern of successional stages within the project area relative to existing conditions and reduce potential wildfire activity by breaking up fuel continuity (page 42, Fire and Fuels Summary)

Table 12: Patches Created Greater than 40 acres in Size under the Homestead Proposed Action in Each Biophysical Setting

Biophysical Setting	Patch Number	Patch Size (acres)
Warm/Moist	1	274
Warm/Moist	2	255
Warm/Moist	3	208
Warm/Moist	4	78
Warm/Moist	5	60
Warm/Moist	6	53
Warm/Moist	7	40

Old Growth

There would be no direct effects to old growth under the proposed action. None of the proposed activities would occur in stands that currently meet minimum old growth criteria. Within the Homestead project area, there are approximately 2,161 acres of potential old growth, much of which is adjacent to existing old growth. There are about 563 acres in the warm and moist biophysical setting, and approximately 1,598 acres in the subalpine biophysical setting (VEG-011). Potential old growth could contribute to an increase in future patch size and amount of old growth. These acres are generally dominated by shade tolerant conifers in the large size class.

The proposed vegetation management activities would indirectly affect species composition and potential forest types of future old growth, assuming that planted trees within harvested areas become established and survive to maturity. This would result in an increase in diversity for old growth cover types compared to current conditions. Also, the proposed action would reduce the potential for stand replacing wildfire in the short term, which could affect existing old growth. Where proposed harvest activities are adjacent to existing old growth stands, the potential for fire spread into old growth stands would be reduced due to the modification of existing fuels. Over time, without disturbance (via management or natural), stand densities and canopy cover would gradually increase, reducing the potential for a stand replacing fire to affect old growth stands. Increasing the potential for western white pine and western larch to occur within future old growth stands as well as improving resistance to disturbance is in alignment with the desired conditions outlined in the Forest Plan (Appendix A, Table A-1: Consistency with Forest Plan).

Cumulative Effects

Within the Homestead project area, Forest Service activity records indicate that approximately 596 acres of even age regeneration harvests have been completed since 1964. These regeneration harvests range in size from 3 to 75 acres, averaging about 20 acres. Reforestation activities after regeneration harvests planted either mixes or single species including western larch, western white pine, Douglas fir, and Engelmann spruce. Generally, white pine blister rust, selective harvesting of blister rust infected trees, and natural succession to shade tolerant species have collectively contributed to the decline of white pine. Blister rust resistant white pine stock became readily available in the mid 1980's. Around 260 of the 596 acres of regeneration harvests occurred prior to 1980, and therefore they were not planted with rest-resistant white pine stock.

Intermediate treatments have occurred on about 1,522 acres within the project area since 1955. Intermediate treatments are designed to enhance growth, quality, vigor, and composition of a stand after establishment or regeneration, and prior to final harvest (Deal, 2018). Intermediate treatments include commercial and precommercial thinning, improvement, liberation, salvage, and sanitation cuts. Additionally, pruning has been completed on about 272 acres. Pruning occurs on western white pine to reduce the risk of fatal blister rust infections. The fact that pruning was completed indicates that white pine was not only planted, but has survived in quantities high enough to warrant pruning, which facilitates further survival.

Recent natural disturbances have occurred within the project area. In 2015, the Breezy and Marble fires took place, affecting approximately 100 and 718 acres respectively. Portions of these affected areas have been salvaged and reforested, contributing to past actions. Tree species planted include western larch, Douglas fir, and Engelmann spruce.

Currently, the primary activities occurring within the project area include fuelwood gathering, Christmas tree cutting, and recreating. These activities generally have little to no effect to forest vegetation.

Foreseeable future vegetation treatments would include precommercial thinning and pruning on those acres where regeneration harvests are proposed. These activities would occur approximately 15 to 20 years after planting has taken place. The need for these activities would be determined after stocking and survival surveys are completed, and stocking levels are calculated. The effects of these stand tending activities are intended to improve tree vigor and species composition , thus increasing individual tree and stand resilience to disturbance agents. Reoccurring activities would include fuelwood gathering,

Christmas tree cutting, and activities associated with recreation. These activities would have a negligible cumulative effect.

Under the proposed action, commercial and non-commercial management activities are designed to improve resilience to future disturbances on approximately 1,421 acres. Forest vegetation on the remaining acres of the project area would continue to follow the vegetative trends that are the result of past natural and management generated disturbances.

The proposed action would result in progression towards the desired future desired conditions for forest composition and forest structure.

Hydrology

Summary

For the proposed action, the analysis was conducted within the Lower, Middle, and Upper Marble Creek drainage (Appendix C, Map C-8). The analysis was based on a 5 to 20-year recovery timeframe. Within five years, surface infiltration and surface erosion concerns should be mitigated as herbaceous vegetation reestablishes on hillslopes, road cuts, fill slopes, and drainage ditches. Within 5 to 20 years, hillslope stability, snow ablation rates, runoff timing, and water yield concerns should be mitigated as tree canopies and root networks are reestablished.

The project is consistent with Executive Orders 11990 and 11988, as there are no activities in floodplains and wetlands.

The baseline (past and present) cumulative effect Equivalent Clearcut Area (ECA) acreage is 22,966 acres, which is 35 percent of the Lower, Middle, and Upper Marble Creek drainage. With the implementation of the proposed action, the cumulative effect ECA acreage is 24,185 acres, which is 37 percent of the Lower, Middle, and Upper Marble Creek drainage, a 2 percent increase over the existing baseline conditions.

Using the Forest Plan Watershed Disturbance modeling approach, the ranking for Equivalent Clearcut Area (ECA) remain unchanged with the implementation of the proposed action compared to baseline conditions within the Lower, Middle, and Upper Marble Creek drainage. Based on ECA modeling, no detectable increases, beyond existing variability in peak flows would be expected from the Lower, Middle, and Upper Marble Creek drainage. Based on Pfankuch stream surveys, no issues were observed or identified as being attributed to existing ECA peak flow events. Based on stream surveys, the only noted concern was elevated sediment deposition in Shearer Creek due to road surface runoff and a scouring culvert outlet on FR321. The road surface runoff and culvert scouring will be addressed with design features and Best Management Practices (BMPs) (Forest Service Manual 2509.22) during road maintenance activities (Appendix D, Design Features).

Using the Forest Plan Watershed Disturbance modeling approach, the ranking for road density, stream crossing frequency, crossing density, and intersect frequency remained unchanged with the implementation of the proposed action. The construction and maintenance of roads could result in sediment escaping the road buffer. This would be expected to be a short term concern peaking immediately following completion of the proposed road construction activities and decreasing

incrementally to no effect within 1 to 5 years. Based on GIS analysis of stream crossing density, the Lower, Middle, and Upper Marble Creek drainage received a high ranking. To mitigate this concern, design features (Appendix D) have been incorporated into the proposed action. In addition, 27.8 miles of roads will be decommissioned reducing road generated sediment 20 tons annually.

The selected alternative is consistent with the requirements of the Federal Water Pollution Control Act as amended by the Clean Water Act, 33 U.S.C. section 1251. According to the Idaho Department of Environmental Quality (IDEQ) no stream within the Homestead project boundary is rated as "not supporting" in the 2014 (final) or 2016 (draft) 305(b) integrated report. Within the Lower, Middle, and Upper Marble Creek drainage, Marble Creek is 305(d) listed by the IDEQ, but not 303(d) listed by the Environmental Protection Agency (EPA) for not supporting temperature. Through the implementation of the spell out in the Inland Native Fish Strategy, or INFS (USDA 1995), and the incorporation of a Riparian Habitat Conservation Area (RHCA) into the Homestead project area, the proposed activities would not further degrade water quality with respect to temperature because the RHCA would retain the canopy cover that prevents solar inputs to the stream. Also, the proposed habitat restoration within Marble Creek will improve water temperature concerns by adding structures to improve shading, pool scouring to add depth, and channel narrowing to improve overhead vegetative cover.

Resource Indicators and Measures

Table 13: Resource Elements, Indicators and Measures for Hydrology Effects Analysis

Resource Element	Resource Indicator	Measure (units)
Watershed Function	Watershed Disturbance modeling that includes: • road density, • stream crossing frequency, • crossing density, and • intersect frequency	 mi/mi2 #/mile of road #/mi2 # crossings/mile of stream
Changes to Peak Flow	Equivalent Clear-cut Area Calculation	Acres

Methodology

For this analysis, the empirical peak flow methodology (Grant et al., 2008) was used to evaluate potential changes to the frequency and intensity of peak flow events. To evaluate road surface sediment, the Water Erosion Prediction Project model (WEPP) roads model (Elliot, 2004) was used to estimate annual sediment erosion from roads.

Effects to Hydrology

Direct and Indirect Effects

A comparison between the existing baseline condition (past and present actions) and the proposed action (past, present, and foreseeable future) was conducted (PF: HYRDO-001 Hydrology Analysis Summary).

Based on the Forest Plan Watershed Disturbance modeling approach, the ranking for road density, stream crossing frequency, crossing density, and intersect frequency remain unchanged with the implementation of the Proposed Action when compared to baseline conditions within the Lower, Middle, and Upper Marble Creek (LMU) drainage.

Water Quality and Quantity

Water quality refers to the physical, chemical, and biological composition of a given water body and how these components affect beneficial uses. Based on the 2014 final and 2016 draft recommendations, the segment of Marble Creek from the confluence with Hobo Creek to the St. Joe River is 305(b) listed as impaired by Idaho Department of Environmental Quality integrated report, but not 303(d) listed by the Environmental Protection Agency for water temperature. A water quality improvement plan (TMDL) has been developed for this segment. Direct incoming solar radiation is the dominant energy input for increasing stream temperatures with shade. Reducing this heat input is the single most important variable to consider (Gravelle and Link, 2007, Krauskopf et.al., 2010). Of the proposed actions, timber harvest is the only activity that could potentially increase the amount of solar radiation reaching streams. Through the implementation of the Inland Native Fish Strategy (USDA 1995), the Idaho Forest Practices Act, and the incorporation of a Riparian Habitat Conservation Area into the Homestead project area, the proposed activities would not further degrade water quality with respect to temperature. The Riparian Habitat Conservation Area would retain canopy cover that prevents solar inputs to the stream. Field reviews of project area streams documented dense, intact overstory. Gravelle and Link (2007), also found that the use of riparian buffers effectively negated the effects of timber harvest impacts to stream temperatures in the reaches directly below harvested areas. In addition, habitat restoration along seven miles of Marble Creek included in the proposed action will improve water temperature concerns by adding pool scouring to add depth, structures to improve shading, and channel narrowing to improve overhead vegetative cover.

To evaluate current stream channel stability, modified Pfankuch (Rosgen, 1996, 2006b) surveys were conducted on Little Daveggio Creek and Daveggio Creek. A general stream survey was conducted on Shearer Creek. The modified Pfankuch survey method evaluates the upper banks, lower banks, and streambed conditions. Based on these criteria, the modified Pfankuch rating ranged from fair to good (PF: HYRDO-002). For Daveggio and Little Daveggio Creeks, fair ranking was given for limited vegetative bank protection, an overly wide and shallow channel, deposition in the channel, bottom substrate size distribution, limited aquatic vegetative cover on substrate, and scouring and deposition in pools. In Shearer Creek, elevated sediment deposition was observed during the survey. The sediment was attributed to road surface runoff and scouring at a culvert outlet. Based on implementation of the design features (Appendix D, Design Features), such as hardening the road surface at the crossing, and proper shaping of the road surface to properly drain away from the stream channel, a reduction in sediment reaching this point would be expected.

Equivalent Clearcut Area (ECA)

Researchers have attempted to quantify the Equivalent Clearcut Area (ECA) method (or similar methodologies) in an attempt to evaluate watershed responses due to timber harvest. Thomas and Megahan (1998) summarized the ECA discussion well. “Given the complex nature of the effects of forest cutting and roads on streams, it is not surprising that the literature provides mixed messages about peak flow responses”. To evaluate potential impacts to streams located within the Lower, Middle, and Upper (LMU) drainage, ECAs were calculated for the LMU Marble Creek watershed. The baseline (past and present) cumulative effect ECA acreage is 22,966 acres which is 35 percent of the LMU Marble Creek

watershed. With the implementation of the proposed action, the cumulative effect ECA acreage is 24,185 acres which is 37 percent of the LMU Marble Creek watersheds, a 2 percent increase over the existing baseline conditions. Based on ECA modeling, no detectable increases beyond existing variability in peak flows would be expected from the LMU Marble Creek drainages. Based on Pfankuch stream surveys, no issues were observed or identified as being attributed to existing ECA peak flow events. This worst case analysis is based on "all" road construction and timber harvest occurring in year-one of the proposed action. In reality, road construction activities would precede timber harvest activities, timber harvest activities would occur in multiple years with subsequent hydrologic recovery.

Road Sediment

With proper Best Management Practices (BMP) implementation, generated road surface sediment should be captured within the road right-of-way or within the adjacent forest litter layer (Seyedbagheri 1996, IDEQ 2016, Edwards et al. 2016). Typically, road surface runoff is transported and deposited in small drainage features that never reach perennial streams. However, when a large rain or rain on snow event occurs, these deposited sediments could be mobilized and transported long distances. During these events, short term impacts to surface water quality could result. The potential for short term impacts would diminish incrementally to no effect within 1 to 5 years. In addition to Best Management Practices, additional design elements have been added to the Homestead project to reduce sediment impacts from road surface sediment (Appendix D, Design Features by Resource). Based on implementation of the design features, a net reduction of 20 tons annually would be expected.

Cumulative Effects

To evaluate Watershed Disturbance Ranking (WDR) for cumulative effects, the total Equivalent Clear cut Area was calculated by combining the proposed timber treatments, existing and proposed road treatments, and past private land timber treatments. Based on the Forest Plan Watershed Disturbance modeling approach, the ranking for road density, stream crossing frequency, crossing density, and stream-road intersect frequency, and Equivalent Clear cut Area would remain unchanged with the implementation of the Proposed Action when compared to cumulative effect baseline conditions within the Lower, Middle, and Upper (LMU) drainage (PF:HYDRO-001).

Aquatics

Summary

The proposed action would not affect federally listed bull trout due to the character of the project and the extremely infrequent and sporadic presence of bull trout in the Marble Creek drainage. The proposed harvest and associated projects may affect, but are not likely to adversely affect designated bull trout critical habitat (DCH) in the Marble Creek drainage due to the potential for fine grained sediment to reach Marble Creek and its tributaries from roads, road related activities, and aquatic habitat restoration activities. Considering the amount and duration of the sediment contributions, the effects would be insignificant to designated bull trout critical habitat in the Marble Creek drainage and would not extend downstream into the St Joe River. There will be no bull trout present to experience the short-term adverse effects to Marble Creek's critical habitat.

The proposed project may impact Westslope Cutthroat Trout individuals or habitat present in all fish bearing streams in the project area, but impacts are not likely contributing to a trend toward federal listing of the species. The proposed action may impact western pearlshell mussels, due to their reliance on Westslope Cutthroat Trout as a host for part of their life cycle, but these impacts would not contribute to a trend toward federal listing.

The proposed action would increase stream connectivity due to the replacement of a barrier culvert in Shearer Creek. The implementation of this project contributes to Forest Plan goals by increasing the diversity of habitat in Marble Creek (AQH-010) and by increasing connectivity in Shearer Creek (AQH-02). Project file document FISH-31 provides documentation of compliance with the Forest Plan. The cumulative effects analysis area is the Marble Creek drainage from the confluence of Homestead to the confluence of Marble Creek and St. Joe River. This area encompasses all drainages which contain project actions. Effects will also be discussed for fish bearing streams within the project area that contribute to Marble Creek.

Resource Indicators and Measures

The following analysis describes how the proposed actions would affect the habitat elements (resource indicators). This analysis specifically considers the following resource indicators:

Table 14: Aquatic Resource Indicators and Measures

Resource Indicator	Measure	Source
Connectivity of Fish Habitat	Miles of connected Spawning/rearing Habitat	Forest Plan: FW-DC-AQH-01,02 and 05, FW-OBJ-AQH-01
Aquatic Habitat	Trend of Aquatic Habitat	Forest Plan: FW-DC-AQH-01, FW-DC-AQH-05, FW-OBJ-AQH-01
Bull trout	Trend of population	FSM 2670.31; Forest Plan: FW-DC-AQS-01, FW-DC-AQS-04 and 05.
Westslope Cutthroat	Trend of population	FSM 2670.32; Forest Plan: FW-DC-AQS-01
Western Pearlshell Mussel	Trend of population	FSM 2670.32; Forest Plan: FW-DC-AQS-01

Methodology

This analysis evaluated how the existing condition could be affected by the proposed action. The quality of fish habitat is influenced by a variety of elements (USFWS, 1998). At a broad scale, the Forest Plan describes the conditions of the habitat elements that would meet the desired condition for aquatic habitat. Surveys, monitoring data, and recent observations provided a refined description of existing conditions. Existing conditions are rated by comparing how closely the existing characteristics meet the desired conditions outlined in the Forest Plan (PF: FISH 001-017, 019-026).

Effects to Aquatics

Direct and Indirect Effects

Barrier Culvert Replacement

The replacement of a barrier culvert on Shearer Creek at Road 321 with an aquatic passage culvert would increase the amount of connected habitat within Shearer Creek by 0.8 miles. The replacement of the culvert would have no effect to bull trout because they are not present in Shearer Creek or in Marble Creek. There would be no effect to critical habitat for bull trout because Shearer Creek does not contain critical habitat. Additionally, research has shown that sediment generated during culvert replacements returns to upstream status approximately 800 miles downstream of the work (Foltz, 2007). Marble Creek, though it does contain unoccupied bull trout critical habitat, is approximately 1000 miles downstream from the culvert site, and thus would not be affected. In the long term, the replacement of the culvert would benefit Westslope Cutthroat Trout. Due to disturbance caused, there could be short term negative effects.

Instream Restoration

In the long term the increase in habitat diversity and complexity would improve the quality of aquatic habitat within Marble Creek. During construction, the project would cause temporary and localized increases in sediment to be suspended in the water column. Activities could disturb and possibly crush some individual aquatic species that are present. Because the only recent detection of bull trout is about 7 miles downstream, the project would have no effect on bull trout. The proposed aquatic habitat restoration activities may impact but are not likely to adversely affect critical habitat for bull trout. This is due to the short-term nature of the negative effects to habitat structure construction, and Best Management Practices and project characteristics that will limit any other potential negative effects (PF: FISH-040). In the long term, project related activity would benefit critical habitat for bull trout because it would increase habitat diversity. Westslope Cutthroat Trout and their habitat in Marble Creek would be affected in the short term but the effect would not likely contribute to a trend toward federal listing. The project would be beneficial to the Westslope Cutthroat Trout in the long term. The proposed project is consistent with Executive Order 12962 as amended by Executive Order 13474 because the short term impacts to Westslope Cutthroat Trout would not cause a reduction in the potential of the recreational fishery of the St. Joe River as outlined in the Idaho Stream Channel Protection Act and the Inland Native Fish Strategy.

Proposed Actions and Sediment Contribution

The other proposed activities (harvest, road construction, road decommission, road storage, and quarry and rockpile development (PF: FISH-030) would individually have no direct effect to the fisheries resource indicators. They could have indirect effects, potentially contributing to a cumulative effect.

Cumulative Effects

Shearer Creek

The trend for aquatic habitat quality should remain in the current status. The replacement of the barrier culvert with a culvert that is properly installed and sized for100 year flow, would improve flow conditions in the long term and connect segments with spawning and rearing habitat. The replacement would cause a short-term increase in sediment to Shearer Creek. The use of Best Management Practices would reduce potential negative effects. A culvert on a non-fish bearing tributary to Shearer Creek is currently contributing sediment to Shearer Creek, but this would be mitigated during road maintenance for this project. No roads were temporary road construction or decommissioning are proposed cross streams, so no sediment should reach a fish bearing stream. The existing good condition of aquatic habitat in Shearer Creek combined with the implementation of riparian zone buffers and Best Management Practices should limit the amount of sediment generated from the proposed activities.

There is potential for the project to have a positive impact (improved access) on individual Westslope Cutthroat Trout in Shearer Creek. There is also a very minor potential for the project to have a negative impact on individual Westslope Cutthroat Trout in Shearer Creek, but this is unlikely because sediment should not reach the stream. Therefore, this project may impact individual Westslope Cutthroat Trout or their habitat in Shearer Creek but will not likely contribute to a trend toward federal listing.

Davies Creek

The trend for aquatic habitat quality should remain in the current status. The culvert removals on roads proposed for decommissioning are over a mile from a fish bearing stream. The use of Best Management Practices and intact vegetative buffers would reduce sediment increases from these activities. The minor amount of timber harvest (6 percent of the drainage) should have no impacts to stream habitat. The current condition of the aquatic habitat would be able to incorporate the immeasurable amount of sediment that might be produced without causing a negative trend to aquatic habitat quality.

There would be a slight potential for sediment to be generated, and for that sediment to reach a fish bearing stream. Therefore, this project may impact individual Westslope Cutthroat Trout or their habitat in Davies Creek, but will not likely contribute to a trend toward federal listing.

Little Daveggio Creek

The trend for aquatic habitat quality should remain in the current status. Approximately three culverts would be removed during road storage or road decommissioning projects. None of these would occur on fish bearing streams. This activity would be beneficial in the long term by reducing risk of culvert failure, but would generate some sediment in the short term. Only one of the culverts is within half a mile of a fish bearing stream. Therefore, the majority of the sediment should settle out before reaching fish habitat.

The proposed harvest (58 acres) would have no effect on aquatic habitat. Approximately 5 percent of the drainage is in non-Forest Service managed lands. This land is at the confluence with Daveggio Creek, has been harvested, and future harvest is likely to occur in a similar manner to what occurred in the past (PF: FISH-026). Harvest on private lands must adhere to Idaho State Best Management Practices regarding stream protection buffers, road construction, and maintenance. The current good condition of Little Daveggio Creek would be able to incorporate the immeasurable amount of sediment that might be produced without causing a negative trend to the aquatic habitat quality.

This project may impact individual Westslope Cutthroat Trout or their habitat in Little Daveggio Creek due to a slight potential for sediment generation that could reach a fish bearing stream, but it is unlikely that this will contribute to a trend toward federal listing.

Daveggio Creek

Aquatic habitat quality should remain in the current status. There are about three culverts that would be removed during road decommissioning. Two are within a half mile of a fish bearing stream, so there is potential for a short-term pulse of sediment to reach a fish bearing stream. Timber harvest is very minor and should not impact fish habitat. Non-Forest Service managed land comprises approximately 37 percent of the Daveggio Creek drainage (excluding Little Daveggio). This land has been harvested in the recent past and future harvest is likely to occur in a similar manner to what occurred in the past (PF, FISH-026). Harvest on private lands must adhere to Idaho State Best Management Practices regarding stream protection buffers, road construction, and maintenance. The current good condition of Daveggio Creek would be able to incorporate the immeasurable amount of sediment that might be produced by projects on non-NFS lands without causing a negative trend to the aquatic habitat quality.

This project may impact individual Westslope Cutthroat Trout or their habitat in Daveggio Creek due to a slight potential for sediment generation that could reach a fish bearing stream but will not likely contribute to a trend toward federal listing.

Homestead Creek

The trend for aquatic habitat quality should remain in the current status. Culvert removal would be beneficial in the long term because of the reduced risk of culvert failure. In the short term, culvert removal could generate some sediment. Only two of the 25 culverts are within a half mile of a fish bearing stream. There would be 7.5 miles of non-system road retained which have approximately 17 culverts. These roads and culverts would continue to present a risk of failure and potentially contribute sediment to non-fish bearing streams. The very minor amount of harvest (less than 1 percent of the drainage) would have no influence on stream habitat. The current good condition of Homestead Creek would be able to incorporate the immeasurable amount of sediment that might be produced without causing a negative trend to the aquatic habitat quality.

There would be a potential for sediment to be generated and for it to reach a fish bearing stream. Therefore, this project may impact individual Westslope Cutthroat Trout or their habitat in Homestead Creek but will not likely contribute to a trend toward federal listing. Bull trout are not present in Homestead Creek, so there would be no effect to individuals or the population. Bull trout critical habitat is designated in the lower 1.6 miles of Homestead Creek. The very limited amount of activity proposed in this area combined with the use of Best Management Pratices and the beneficial long-term effects of culvert removals may affect, but is not likely to adversely affect critical habitat for bull trout.

Marble Creek

The combination of all activities would create an improving trend in the long term, but a downward trend in the short term. Culvert removal would be beneficial in the long term because of the reduced risk of culvert failure. In the short term, it could generate some sediment. Only one of the 5 culvert removals proposed is within a half mile of a fish bearing stream. New road construction includes four crossings over non-fish streams. The location of these crossings, over one-half mile from Marble Creek, prevents

impacts to Marble Creek. Timber harvest is proposed on approximately 25 percent of the acres included in the Marble Creek face drainage (non-fish streams) portion of the project area. There is potential harvest on non-Forest Service managed lands (40 acres in a Marble Creek face drainage). Harvest on private lands must adhere to Idaho State Best Management Practices regarding stream protection buffers, road construction, and maintenance. The current fair to poor condition of Marble Creek, primarily due to lack of habitat diversity, combined with the use of Best Management Practices on Forest Service and private lands would allow the stream conditions to incorporate the minor combined amount of sediment that might be generated without causing further negative trends to the aquatic habitat quality. Long term, the instream restoration would increase habitat diversity, contributing to an upward trend in aquatic habitat quality. That said, these activities would create short term and localized increases in sediment that could settle into the existing limited pool habitat and cause a temporary downward trend.

Long term, there would be a benefit to Westslope Cutthroat Trout and habitat due to increased habitat diversity and complexity. In the short term, there would be a potential for sediment to be generated that would have a minor effect to the fish habitat of Marble Creek. Therefore, this project may impact individual Westslope Cutthroat Trout or their habitat in Marble Creek but will not likely contribute to a trend toward federal listing.

Bull trout have only been identified twice in Marble Creek since about 2000 and these occurrences were within the lowest two miles of Marble Creek. The project area is approximately 7 miles upstream from the furthest upstream detection. Due to the lack of detection near the project area, there would be no effect to individuals or the population. Bull trout critical habitat is designated for the entire length of Marble Creek. The implementation of the proposed harvest and associated actions may effect but are not likely to adversely affect bull trout critical habitat in Marble Creek. This is due to the low potential for the project to generate a small amount of sediment that could reach Marble Creek.

Economics

Summary

Timber management activities within the project area have the potential to impact the economic conditions of local communities and counties. A financial efficiency analysis showed that the proposed activities would result in viable timber sale(s) that would provide about 29 million board feet of timber (52,798CCF) with a present net value of about $2.6 million. When accounting for all project activities, both related to the timber sale and other restoration activities, the present net value of the project is $2.0 million. The Homestead project would also create or maintain an estimated 25 jobs per year during the life of the project.

Resource Indicators and Measures

People and economies are an important part of the ecosystem. Use of resources and recreational visits to national forests generates employment and income in surrounding communities and counties. They also generate revenue that is returned to the Federal treasury or used to fund additional on-the-ground activities to accomplish resource management objectives. Resource indicators and measures for the analysis are included below.

Table 15: Economic Resource Indicators and Measures for Assessing Economic Effects.

Resource Indicator	Measure
Project feasibility	Anticipated costs and revenues
Financial efficiency	Present net value
Economic impact	Estimated jobs and labor income

The Homestead Project is located on the St. Joe Ranger District of the Idaho Panhandle National Forest. The combination of small towns and rural settings, along with people from a wide variety of backgrounds, provides a diverse social environment for the geographic region around the Idaho Panhandle National Forest, including the St. Joe Ranger District. Residents pursue a wide variety of lifestyles but many share a common theme: an orientation to the outdoors and natural resources. This is reflected in both vocational and recreational pursuits, including employment with logging and milling operations, outfitter and guide businesses, and wide scale participation in hiking, hunting, fishing, camping, and many other recreational activities. Timber, tourism, and agricultural industries are important to the economy of local communities. Despite the common concern for, and dependence on natural resources within the local communities, social attitudes vary widely with respect to their management. Residents hold a broad spectrum of perspectives and preferences ranging from complete preservation to maximum development and utilization of natural resources.

Effects to Economics

Economic impacts are used to evaluate potential direct, indirect, and cumulative effects to the economy. These impacts are estimated using input-output analysis. Input-output analysis is a means of examining relationships within an economy, in both business to business and business to final consumer relationships. The economic impact effects are measured by estimating the jobs and labor income generated from: 1) processing timber volume generated from the project; and, 2) Forest Service expenditures for contracted restoration activities included as part of the proposed treatments. The direct employment and labor income benefits employees and their families, and therefore, directly affect the local economy. Additional indirect and induced, or multiplier effects (ripple effects) are generated by direct activities. Together, the direct and multiplier effects comprise the total economic impacts to the local economy. Indirect effects are felt by the producers of materials used by directly affected industries. Induced effects occur when employees of the directly and indirectly affected industries spend the wages they receive.

Affected Environment

Most of the land area encompassed by the three-county economic impact area is managed by various public agencies, while 21 percent of the 3.0 million acres is under private ownership. The Forest Service manages 1.9 million acres, or 63 percent of the land area within the Homestead impact area. Mineral County has the largest share of Federal public lands (82 percent), followed by Shoshone County with 75 percent Federal public lands. The land ownership proportions are quite different in Benewah County, with just 9 percent public land ownership. By comparison, Federal lands make up 28 percent of the land area of the United States. In the most recent available data from the Department of Commerce, timber was the largest component of the commodity sector employment in the impact area, accounting for 13.6 percent of total employment, followed by mining with 12.6 percent, and agriculture accounting for 3.4 percent of

total employment. In comparison, agriculture accounted for 1.3 percent of the total number of jobs in the United States, while timber accounted for 0.6 percent and mining accounted for 0.5 percent.

Environmental Consequences Direct and Indirect Effects

Project feasibility is used to determine if a project is feasible, that is, will it sell, given current market conditions. The determination of project feasibility relies on a residual value (stumpage equals revenues minus costs) feasibility analysis, which considers logging system, timber species and quality, volume removed per acre, lumber market trends, costs for slash treatment, and the cost of specified roads, temporary roads and road maintenance. The appraised stumpage rates are compared to the base rates (revenues considered essential to cover regeneration plus minimum return to the federal treasury). The project is considered feasible if the appraised stumpage rate exceeds the no action alternative. If the feasibility analysis indicates that the project is not feasible, the project may need to be modified. Infeasibility indicates an increased risk that the project may not attract bids and may not be implemented. The appraised stumpage rate and base rates for the proposed action are displayed in Table 16. For the proposed action, the appraised stumpage rate is greater than the no action alternative, indicating that it is feasible, and highly likely to sell.

Table 16: Project Feasibility and Financial Efficiency Summary (2018 dollars)

Category	Measure	Proposed Action
Timber Harvest Information	Acres Harvested	1,232
Timber Harvest Information	Sawtimber Volume Harvested (CCF)	52,798
Timber Harvest Information	Base Rates ($/CCF)	21.42
Timber Harvest Information	Appraised Stumpage Rate ($/CCF)	80.12
Timber Harvest Information	Predicted High Bid ($/CCF)	85.77
Timber Harvest Information	Total Revenue (Thousands of $)	4,528
Timber Harvest & Required Design Features	Present net value ($Thousands)	2,620
Timber Harvest & All Other Planned Non-Timber Activities	Present net value ($Thousands)	2,008

Cumulative Effects

The financial efficiency of the project would not be affected by past, present, or reasonably foreseeable future actions in the project area. Other projects occurring in the economic impact area have the potential to contribute cumulatively to jobs and labor income provided by implementing this project.

This decision will not disproportionately impact minority or low-income populations. There were no public comments raised regarding environmental justice considerations, and no disproportional impacts to minority or low-income populations were identified during scoping or any other portion of public involvement during the course of analysis. Therefore, the proposed action complies with this order.

Soils

Summary

The Homestead vegetation management project proposes commercial timber harvest and fuels treatments in many areas where soils are already impacted from previous logging and homesteading activities. The extent of the existing impacts varies widely by unit, and many units required project design features and mitigation measures in order for the proposed timber harvest to meet the Regional Soil Quality Standards. Three units (comprising 11 percent of the proposed treatment acres) had an existing condition that exceeded the 15 percent Detrimental Soil Disturbance (DSD) threshold. The disturbance in these units is in the form of legacy skid trails, and they are so extensive in these units that it is reasonable to conclude that the proposed harvest would not expand the footprint of disturbance. Entering these units would allow the completion of needed decompaction and rehabilitation work on these legacy trails. By decompacting heavily impacted areas of these units, the result of the Homestead project will improve upon the existing soil physical properties and return some degree of soil function.

In units that were at risk of exceeding Regional Soil Quality Standards (including the 3 discussed above), several legacy skid trails have been identified that would be decompacted and rehabilitated to improve site conditions. Units approaching the Detrimental Soil Disturbance (DSD) threshold are also addressed through unit design and changing to logging systems that are less impactive than a standard ground-based system harvested during the summer dry season. Design features that are used to minimize impact to soils and meet soil quality standards are mandatory winter harvest and requiring the purchaser to reuse existing skid trails.

Rehabilitation efforts and design features are critical element of the Homestead project in order to comply with the Idaho Panhandle National Forest (IPNF) Land Management Plan and Regional Soil Quality Standards. The proposed action would meet Regional soil quality standards within the project boundary, and in some instances improve existing soil physical properties through additional rehabilitation. Given the design features and rehabilitation efforts occur as detailed in this section, this project is expected to comply with the IPNF Land Management Plan and the Regional Soil Quality Standards.

This section includes issues pertaining to the soils resource that have been identified for detailed analysis. This section focuses on the issue that required special consideration in the analysis, design features, and mitigation measures to ensure the Homestead project would not cause significant impacts to the soils resource. To view the full extent of data gathered and assessed, see the soil project file.

Resource Indicators and Measures

Table 17: Soil Resource Indicators

Issue	Indicator or Measure	Source
Soil productivity and function	Detrimental Soil Disturbance (DSD)	FSM 2500 supplement 2500-2014-1 (*Forest Service Manual: Northern Region (Region 1)*, 2014) and the IPNF Land Management Plan (*Idaho Panhandle National Forest Land Management Plan*, 2015)

Methodology

Analysis Area (Spatial and Temporal Context)

The treatment unit is considered an appropriate geographic unit for assessing direct and indirect soil environmental effects because soil productivity is a site-specific attribute of the land and is not dependent on the productivity of an adjacent area. Assessing soil quality within too large an area can mask localized, site specific effects. For these reasons, a watershed approach is not taken to evaluate cumulative effects to soil productivity.

A defining temporal context is necessary in this analysis because soil has a degree of resiliency that will allow it to recover from minor soil disturbance within a shorter period of time. Determining a temporal boundary to analyze the condition of soil is difficult and arbitrary. Detrimental impacts are those that are unable to rehabilitate under natural conditions and continue to be present 40 years after project implementation. This is an appropriate period of time within which the Forest Service can expect to re-enter an area to continue with active vegetation management.

The analysis area for direct, indirect, and cumulative effects on soil resources encompasses all land within individual treatment units. Existing classified National Forest System roads and trails are considered dedicated lands for administrative purposes and, as such, Region 1 soil quality standards and Land Management Plan guidelines do not apply to system roads when evaluating the treatment units. Cumulative effects to soils are those effects that overlap in time and space, so there would be no cumulative effect where there are no direct or indirect effects.

Methods Used

Field surveys were stratified and prioritized based on site history, and observations of other field going personnel. The Forest Soil Disturbance Monitoring Protocol (FSDMP) was used to determine the existing condition for detrimental soil disturbance. A detailed description of the methods used can be found in the project file (PF: SOIL-0024).

Effects to Soils

Soil Disturbance

Soil disturbance is a general term for the suite of impacts to soils from vegetation management activities. These impacts may include compaction, rutting, soil displacement, burning, and mixing. The direct and indirect effects from the various types of soil disturbance are described in detail in the project file (PF: SOIL-025). The remainder of this section will discuss those units approaching the threshold of exceeding the Regional Soil Quality Standards, and the measures that will be taken in implementation (described as both Design Features and Mitigation Measures) to ensure the Homestead project will comply with the IPNF Land Management Plan and Regional Soil Quality Standards.

There are two primary design features that were applied to maintain soil productivity and function and meet the regional soil quality standards: 1) to reuse existing skid trails, and 2) require a mandatory winter harvest. By requiring the equipment operator to reuse the existing skid trails, we are isolating disturbance

associated with this proposed action to areas that are already detrimentally impacted and not increasing the spatial extent of disturbance. This is an effective strategy in reducing post-activity Detrimental Soil Disturbance and maintaining soil quality standards. By reusing these areas, the opportunity also presents itself to decompact and slash these heavily impacted areas. There are several units that will be required to reuse a certain amount of the existing disturbance in order to meet soil quality standards. Those units are listed in Appendix B, Resource Specific Activities Soils Tables.

The second design feature that will be required in several units is to harvest during the winter, specifically on top of 12 inches of settled snow or frozen ground (Appendix D). The snow or frozen ground provides an effective buffer between the heavy equipment and the soil surface. When operating on settled snow, the impacts typically incurred by the mineral profile would be transferred into the snow, limiting the extent of compaction and rutting to the soil below. When operating on frozen ground, the ice increases soil strength and increases the resiliency of the soil to disturbance. While this design feature is effective in minimizing detrimental soil disturbance, it is critical when operating under winter conditions to continually monitor the condition of the snow or frozen profile.

In units where the timber sale may not cover the extent of soil rehabilitation recommended, additional mitigation will be required. A map and a shapefile of these areas can be viewed in the project file (PF: SOIL-023). In heavily impacted units, existing areas of disturbance have been identified on LiDAR as an initial estimate on the spatial extent to which the Homestead project might be able to restore existing skid trials. The skid trails that will be reused for the harvest activities will be required to be rehabilitated through the timber sale contract. Skid trails that are not reused will be rehabilitated through alternative funding mechanisms. A summary of the units that will require soil rehabilitation are included in Appendix B, Resource Specific Activities.

Prescribed Burning

All prescribed burn activities shall comply with the IPNF Land Management Plan and Regional Soil Quality Standards. A more detailed description of the direct and indirect effects to soil from burning can be found in the project file (PF: SOIL-025).

Temporary Roads

Approximately 2.8 miles of temporary road is proposed, Specific Activities Appendix B shows the Detrimental Soil Disturbance (DSD) that will be added to each activity unit due to temporary roads. This column includes the recovery from temporary road rehabilitation after the harvest is complete. In surveyed units where the proposed temporary roads exist and were accounted for in the existing DSD surveys, the estimated temporary road template (as shown in the “Temp Road DSD” column) was not factored in to the calculation for cumulative DSD (Appendix B, Resource Specific Activities-Soils). More in-depth analysis on the effects of temp roads and temp road rehabilitation can be found in the project file (PF: SOIL-025).

Cumulative Effects

Cumulative effects are only possible for the soils resource when activity units overlap. An effected soil that has received excessive equipment traffic such that bulk density has detrimentally increased does not mean that the bulk density or infiltration rates of adjacent soil is also negatively affected.

There are no cumulative effects for the soil resource, as no future ground disturbing activities are planned for the project area

Other Resource Issues

Effects to Fire and Fuels

Summary

The proposed action would reduce fuel loading and susceptibility of the area to severe wildfire. This is predicated upon completion of fuels treatments that include timber harvest, and subsequent removal, rearrangement, and burning of resulting slash. The slash created from harvest would probably increase fire behavior if a wildfire were to start in the area prior to slash treatment. However, design features and compliance with Idaho Forestry Best Management Practices would hasten slash treatments and planting efforts with tree species that are resistant to fire and disease. Timely slash treatments aided by a logging schedule that allows areas to become available for fuels work as soon as possible after harvest is crucial to meeting the fuels reduction objectives of this project.

With the introduction of more seral species after harvest, heterogeneity across the project area increases, as does resistance to disease and fire. Reduced ladder fuels, including buildup of debris on the forest floor due to trees dying from insects and disease reduce the probability of torching and the chance of crown fires. Fires that stay on the ground can be managed more effectively, helping achieve the Forest Plan desired condition for firefighter and public safety in the event of a wildfire. Reduced flame lengths, and reduced probability of torching and crowning would allow for more options in fire management and increased firefighter safety during fire suppression activities.

The proposed action would create some openings that are larger than 40 acres in size. These relatively large openings would create a more heterogeneous pattern across the landscape and reduce potential wildfire activity by breaking up fuel continuity. Fire behavior and severity depend on fuel properties like fuel continuity (Graham et al., 2004). Continuous aerial extent of closed canopy contributes to sustained crown fire once initiated (Scott and Reinhardt, 2001). The larger the openings, the more effective treatment areas are for suppression resources to engage the fire more safely and under more severe conditions. Smaller areas are subject to increased risk of spotting as there is less distance for embers to travel to reach receptive fuels (Weatherspoon and Skinner, 1996, Van Wagtendonk, 1996).

Regeneration harvest on units greater than 40 acres in size create more slash in the short term than either of the other alternatives, but design features and compliance with Idaho Forest Best Management Practices would hasten slash treatments, resulting in larger openings with less fuel available to wildfire. These larger harvest units not only create fuel breaks, but promote growth of more fire-resistant tree species in the long term. The proposed action includes large openings that meet the purpose and need to promote forest conditions that will reduce the risk of wildfire to National Forest System lands.

Recognizing that fire is an important part of the ecosystem, it would be allowed to play a role as a natural disturbance agent in the proposed prescribed burning activities for whitebark pine habitat enhancement that are included in the Homestead project.

See the project file for a report on existing fuel characteristics across the project area (PF: FF-008). Landscape fire behavior modelling indicates that fuels reduction treatments included in the proposed action would reduce flame length and fire line intensity if a fire were to start under typical fire season weather conditions (PF: FF-009, FF-010).

Effects to Air Quality

Summary

Unlike wildfires, which burn under uncontrolled and unplanned circumstances, prescribed fires are planned events that are regulated by states and subject to strict air quality standards. Where burning is proposed in the Homestead project area, design features would ensure attention to smoke management and Clean Air Act laws and regulations, including coordination with the Montana and Idaho Airshed Group. Direction of smoke plumes can be predicted through computer modeling and meteorology, and smoke production can be controlled somewhat by burning under specific prescriptive conditions, and in small acreages. Occasionally, smoke from a prescribed fire may accumulate in a community, but any impacts are typically light and often last no more than a few hours. Even this is unlikely in the Homestead project area, due to the remote location of the project in reference to populated areas and other sites sensitive to degraded air quality. Other impacts such as dust from timber harvest and hauling or from rock pits created for road work, would be short term and localized.

Effects to Recreation

Summary

The proposed action will result in a motorized trail and road system which better reflect existing recreational access use. Temporary impacts to summer and winter trails and dispersed recreation will occur during project implementation due to tree harvesting and truck traffic. Many opportunities for these activities exist in the surrounding National Forest lands. There are no developed recreation opportunities within the project area. Existing dispersed camps will be protected or reconfigured if they are impacted during project implementation by landings or haul routes. See the recreation project file for specific motorized route changes and inventoried dispersed campsites.

Effects to Scenic Resources

Summary

Effects of timber harvest and temporary road construction would be visible from Forest Road 321, a Concern Level 1 route, in the immediate foreground and middle ground viewing distances. The visible effects of timber harvest would be evident as openings with few trees remaining, while the effects of road construction would result in unnatural appearing linear contrasts. Similar effects will be visible from Forest Trail Numbers 251 and 275, which are also Concern Level 1 routes. Design features are included as part of the proposed action to address these effects. The proposed action would meet the Scenic Integrity Objectives outlined in the Forest Plan.

Effects to Heritage

Summary

The proposed project is located in an area with a high density of cultural sites. A total 12 heritage surveys have been conducted within the Homestead Project area. A total of 76 heritage sites are located within the project area, and all of these sites are historic in nature. Of the 76 sites, 26 are recommended eligible for the National Register of Historic Places (NRHP), two not eligible to the NRHP, two have unknown status, and 46 are unevaluated. An appropriate inventory of proposed activity areas in the Homestead project area has been completed (FW-DC-CR-01, FW-OBJ-CR-01). This inventory was conducted during the fall of 2018, and in spring and summer of 2019.

The inventory results for the Homestead Project located four new heritage sites within the project boundary, a historic homestead, a historic trash dump, a historic log chute, and a historic logging camp. The logging camp is recommended as eligible for the National Register of Historic Places (NRHP.) The homestead, trash dump, and log chute are recommended not eligible for the NRHP. In addition, ten sites were updated for the project. One log chute is recommended not eligible for the NRHP. Another log chute will be crossed by a proposed road and is also recommended as not eligible for the NRHP.

The project would meet guidelines (FW-GDL-CR-01) for cultural resources. All contracts of work in relation to this project would include language for the protection of National Register listed or eligible properties, either known or located through inadvertent discovery, and would include language protection and preservation protocols for any inadvertent discover of human remains. Proposed activities would not impact treaty rights, cultural sites or cultural use. Field surveys of the Area of Potential Effect (APE) have identified no listed or eligible scientific, cultural, or historic resources in the area that would be adversely affected by this decision. All known eligible heritage resource sites have been identified in the project area and will be avoided. As required by Section 106 of the NHPA, a Section 106 survey was completed, and consultation has been completed with the Idaho State Historic Preservation Office.

Effects to Wildlife

Summary

No federally listed species are likely to be affected by this project. For sensitive species, the Homestead project would have no impact on peregrine falcon, bald eagle, black swift, Coeur d'Alene salamander, common loon, flammulated owl, fringed myotis, northern bog lemming, pygmy nuthatch, or Townsend's big-eared bat. Gray wolf, black-backed woodpecker, harlequin duck, and western toad have habitat or are suspected to occur within the Homestead project area, but anticipated impacts are at an inconsequential level. The project will not likely jeopardize the continued existence of the distinct population segment of wolverine, as disturbance associated with land management activities such as forestry, and fire and fuels reduction is not a threat to conservation of the species (USDI Fish and Wildlife Service 2013). Since the project area contains both capable and suitable fisher habitat, that species was analyzed in detail. Consequently, the proposed action, in conjunction with the past, present and reasonably foreseeable

actions may impact fisher or their habitat, but will not likely contribute to a trend towards Federal listing , or cause a loss of viability to the population or species.

Table 18: Wildlife Summary Table

Common Name (*Scientific Name*)	**Habitat**	**Rationale for Elimination from Detailed Analysis**	**Determination**
Threatened and Endangered Species			
Canada Lynx (*Lynx canadensis*)	Higher elevation lodgepole pine and spruce/ fir forests with adequate prey base of snowshoe hares, its primary food.	Project does not occur within an LAU (Lynx Analysis Unit) and no suitable habitat in the project area.	No Effect
Grizzly Bear (*Ursus arctos*)	Habitat generalist. Denning areas isolated and remote from human development.	The species is not known or suspected on the St. Joe Ranger District.	No Effect
Woodland Caribou (*Rangifer tarandus caribou*)	Above 4,000 ft. in Engelmann spruce/subalpine fir and western red cedar/western hemlock forests.	The species is not known or suspected on the St. Joe Ranger District.	No Effect
Proposed Species			
North American Wolverine (*Gulo gulo*)	Far-ranging omnivorous habitat generalist.	Small amounts of persistent snow and no suitable maternal denning habitat near the activity area.	Not likely to jeopardize continued existence
Sensitive Species Analyzed in Detail in the Wildlife Report			
North American Wolverine (*Gulo gulo*)	Far-ranging omnivorous habitat generalist	Small amounts of persistent snow and no suitable maternal denning habitat near the activity area.	May impact individuals or habitat, but will not likely contribute to a trend towards federal listing or loss of viability to the population or species
Fisher (*Pekania [Martes] pennanti*)	Mesic, contiguous mature forest habitats.	The project area contains suitable habitat for fisher. Additional discussion on impacts to fisher can be found in the Homestead Wildlife Report.	May impact individuals or habitat, but will not likely contribute to a trend towards federal listing or loss of viability to the population or species.
Sensitive Species NOT Analyzed in Detail in the Wildlife Report			
American Peregrine Falcon (*Falco peregrinus anatum*)	Open habitats near cliffs and mountains. Nesting cliffs near an adequate prey base.	No impacts to suitable nesting habitat, there is no suitable habitat in the project area.	No Impact
Bald Eagle (*Haliaeetus leucocephalus*)	Normally nest and forage near large bodies of water.	No impacts to nesting, winter roosting or foraging habitat.	No Impact
Gray Wolf (*Canis lupus*)	Large areas with high prey densities and isolation from human activities. Availability of den and rendezvous sites.	No reduction in prey densities, increase in public motorized access. There is potential for disturbance to a potential den/rendezvous sit which will be addressed through a Design Feature.	May impact individuals or habitat, but will not likely contribute to a trend towards federal listing or loss of viability to the population or species.
Black-backed Woodpecker (*Picoides arcticus*)	The presence of bark-beetle outbreaks and post-fire areas in forested habitats.	No immediate post-fire habitat or areas of extensive insect infestation proposed for treatment.	May impact individuals or habitat, but will not likely contribute to a trend towards federal listing or loss of viability to the population or species.
Black Swift (*Cypseloides niger*)	Builds nest behind or next to waterfalls and wet cliffs.	No impacts to suitable nesting habitat, there is no suitable habitat in the project area.	No Impact

Common Name (*Scientific Name*)	**Habitat**	**Rationale for Elimination from Detailed Analysis**	**Determination**
Coeur d'Alene Salamander (*Plethodon vandykei idahoensis*)	Springs, seeps, spray zones.	Suitable habitat would not be affected by proposed activities.	No Impact
Common Loon (*Gavia immmer*)	Large, clear lakes below 5,000 ft. in elevation with at least a partially forested shoreline.	No impacts to suitable habitat, there is no suitable habitat in the project area.	No Impact
Harlequin Duck (*Histrionicus histrionicus*)	Shallow, swift streams in forested areas.	There have been ducks detected downstream from the project area.	No Impact
Northern Bog Lemming (*Synaptomys borealis*)	Bogs, fens and, wet alpine and sub-alpine meadows.	The species is not known or suspected on the St. Joe Ranger District.	No Impact
Townsend's Big-eared Bat (*Corynorhinus townsendii*)	Caves, mines, and abandoned buildings.	No impacts to suitable roosting habitat, there is no suitable habitat in the project area.	No Impact
Western Toad (*Bufo boreas*)	Breed in lakes, ponds, streams and persistent water sources.	Inland Native Fish Strategy (INFS) buffers and Best Management Practices (BMPs) reduce risks to toads.	May impact individuals or habitat, but will not likely contribute to a trend towards federal listing or loss of viability to the population or species.
Pygmy Nuthatch (*Sitta pygmaea*)	Ponderosa pine habitat, especially mature and old growth stands.	Almost no capable habitat (117 acres of a 16,757 acre project area)	No Impact
Flammulated Owl (*Otus flammeolus*)	Mature or old growth ponderosa pine and Douglas fir forest.	Almost no capable habitat (117 acres of a 16,757 acre project area).	No Impact
Fringed Myotis (*Myotis thysanodes*)	Caves, mines, and abandoned buildings; large snag habitat in dry-site forest.	No caves, mines, or abandoned buildings in the project area almost no capable habitat.	No Impact
Other Wildlife Species			
Elk Security (*Cervus elaphas*)	Mosaic of habitat types that provide areas for foraging and areas for thermal and security cover.	Project is outside Elk Security areas. There will be a beneficial impact to elk security due to road decommissioning. Additional discussion on elk security can be found in the Homestead Project Wildlife Report	Current levels of elk security in the Homestead project area are 1,442 acres (EA, Appendix C, Map C-7 Retention Acres). Based on an evaluation of current road prescriptions elk security was updated to 1,365 acres for 2019 in the project area. Road prescription changes of closed, decommissioned, or a barrier occur to 1.92 miles of road sufficiently close enough to increase elk security EMU 6-5.
Migratory Bird Treaty Act (MBTA) and The Landbird Assemblage (Focal Species)	Multiple Habitat types and structures	The USDA Forest Service MOU with the Fish and Wildlife Service expired December 31, 2017. The MBTA and the related Executive Order remain in place as do all related FWS regulations and permitting processes. Migratory birds are monitored through data collected by the Bird Conservancy of the Rockies and their Integrated Monitoring of Bird	The landbird assemblage and the MBTA is monitored at the Forest-level scale by the ongoing effort of the Integrated Monitoring using Bird Conservation Regions. Migratory birds are monitored through data collected by the Bird Conservancy of the Rockies and their Integrated Monitoring of Bird Conservation

Common Name (*Scientific Name*)	Habitat	Rationale for Elimination from Detailed Analysis	Determination
		Conservation Regions (IMBCR).	Regions (IMBCR).

Additional discussions related to wildlife species can be found in the Homestead Wildlife Report (PF: W-001).

Effects to Minerals

Summary

The Idaho Panhandle National Forests Minerals and Geology Program performed queries with the LR2000 database that is operated and maintained by the Bureau of Land Management to identify potential claimants within the analysis area. The Minerals and Geology Program also queried with local Forest Service databases to identify potential mineral operations that would be impacted by actions identified in this environmental analysis. No minerals activities were identified in the project area. The project area did not contain any unpatented or patented mineral claims that would be impacted by the proposed action. No abandoned mine land features were identified within the analysis area. The proposed action will have no effect on minerals.

Effects to Sensitive Plants

Summary

The proposed project would have no effect (NE) on federally listed threatened or endangered plant species or their habitat, as no suitable habitat occurs in the project area for either of the two species currently listed for the forest (USDI Fish and Wildlife Service, 2017). Three documented occurrences of Whitebark pine, a species proposed for federal listing, are documented in the project area. As discussed in the TES Plants BA and BE, this species is treated as a Region 1 sensitive species. All of the Whitebark pine occurrences are located well away from any proposed commercial harvest units and associated transportation system management activities. Whitebark pine restoration treatment is proposed for 202 acres encompassing the third occurrence. See page 9 for a discussion of vegetation treatments and Appendix C, Map C-2.

Pre-field review of the project area identified habitat suitable for several sensitive plant species found on the Idaho Panhandle National Forest, and noted documented sensitive plant occurrences near the project area. No occurrences were detected within proposed timber harvest units during targeted plant surveys carried out in 2018. Should any additional sensitive plant occurrences be found during project implementation, aside from Whitebark pine occurring within the 202 acres proposed for restoration, project design features call for avoidance (spatial or temporal buffering) of these sites.

Based on these findings and project design features, potential effects to sensitive species likely to occur in the project area from the proposed activities (specifically, soil disturbance and changes in the light, moisture, and temperature regime resulting from timber harvest and roadwork) may impact individuals or habitat (MIIH), but would not likely trend these species toward federal listing. Proposed Whitebark pine treatment may adversely impact (injure or kill) some individual trees, but would not trend this species toward federal listing, and would provide long term benefits to its habitat (MIIH).

The proposed activities align with Executive Order 13112 both by enacting measures to prevent new weed establishment, and also by taking steps to proactively monitor for new weed introductions or spread from existing weed infestations, so that treatments can be implemented effectively (Appendix D).

Agencies or Persons Consulted

The Forest Service consulted the following Federal, State, tribal, and local agencies during the development of this environmental assessment.

1. Benewah County Commissioners
2. Benewah County Natural Resource Team
3. Shoshone-Benewah Collaborative Group
4. Coeur d'Alene Tribe
5. Idaho Department of Parks and Recreation
6. Idaho Department of Fish and Game
7. Idaho State Historical Preservation Office
8. Shoshone County Commissioners
9. U.S. Fish and Wildlife Service
10. Idaho Department of Environmental Quality

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The following are references that were utilized in the effects analyses for all resources. Not all of these are cited within this document, which summarized the findings of the analyses, but all were cited within the resource reports upon which this document is based.

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Appendix A- Consistency with the Forest Plan

Subject to valid existing rights, all projects and activities authorized by the Forest Service must be consistent with the applicable Forest Plan components (16 USC 1604(i)) as described at 36 CFR 219.15 of the 2012 Planning Rule.

Elements of the IPNF Forest Plan are Goals, Desired Conditions, Objectives, Guidelines, and Standards. In addition to those that are applicable forest wide, the Forest Plan (p. 69) describes Desired Conditions, Guidelines and Standards for Management Area 4a (pages 64-67), Management Area 5 (page 69-71) and Management Area 6 (pages 71-72). The following table describe consistency with applicable Forest Plan elements, by resource.

Table A-1: Forest Plan Consistency By Resource

Resource	Applicable Element	Attainment
Forest Vegetation	**Goals, Desired Conditions, and Objectives** GOAL-VEG-01 FW-DC-VEG-01 FW-DC-VEG-02 FW-DC-VEG-03 FW-DC-VEG-04 FW-DC-VEG-05 FW-DC-VEG-06 FW-DC-VEG-11 MA5-DC-VEG-01 MA6-DC-VEG-01 MA6-DC-TBR-01 FW-OBJ-VEG-01	**Proposed Action:** The proposed action would help trend vegetation toward Forest Plan goals (GOAL-VEG-01). Treatments would trend the pattern of forest conditions within the project area toward the desired condition. There would be an increase in the representation of western larch and western white pine while reducing the grand fir/cedar/mountain hemlock mix dominance group (FW-DC-VEG-01, FW-OBJ-VEG-01), thereby increasing the amount of tree species that are less susceptible to root disease fungi, blister rust disease, and certain forest insects (FW-DC-VEG-06). Tree densities and the number of canopy layers within stands would generally be decreased (FW-DC-VEG-04) and more of the project area would be dominated by the seedling/sapling size class in diverse patch sizes (FW-DC-VEG-02, FW-DC-VEG-05). The proposed action would trend the warm/moist biophysical setting toward the desired condition (FW-DC-VEG-11). Within the warm/moist biophysical setting approximately 3,286 acres, where no treatments are proposed, could contribute to an increase in future patch size and amount of old growth. These acres are dominated by shade tolerant conifers in the large size class (FW-DC-VEG-03). All proposed treatments occur on lands suitable for timber production (MA6-DC-TBR-01). No treatments are proposed in MA 4a or MA 5. Natural ecological processes and disturbances would be the primary forces affecting the composition, structure, and pattern of vegetation in MA5 (MA5-DC-VEG-01).
Forest Vegetation	**Standards** FW-STD-VEG-01 FW-STD-VEG-02 FW-STD-TBR-01 FW-STD-TBR-02 FW-STD-TBR-03 FW-STD-TBR-04 FW-STD-TBR-05 FW-STD-TBR-06 FW-STD-TBR-07 MA5-STD-TBR-01 MA5-STD-TBR-02 MA6-STD-TBR-01	**Proposed Action:** The proposed action would be consistent with all relevant vegetation and timber standards. No activities are proposed in old growth (FW-STD-VEG-01) or ancient cedar groves (FW-STD-VEG-02)**.** All lands proposed for timber harvest are suitable timber lands (FW-STD_TBR-01). The potential for openings in excess of 40 acres was disclosed to the public during the initial project scoping period. Over 40-acre openings are discussed in detail in this EA and in the Forest Vegetation analysis. Regional Forester approval will be sought in order to follow through with the creation of the proposed large openings. The proposed action will comply with this standard following completion of public notification and pending approval from the Regional Forester (FW-STD-TBR-02). Site-specific silvicultural prescriptions use locally-adapted methods proven to regenerate trees within five years. Regeneration harvests are not proposed on sites with potential regeneration success concerns (FW-STD-TBR-03). The stands proposed for regeneration harvests generally have not met CMAI. Inclusion of these stands is intended to increase the amount western white pine and western larch dominance types and increase the amount of the seedling/sapling size class while decreasing the grand fir/cedar/mountain hemlock dominance types. This would trend the project area towards the vegetation desired conditions (FW-STD-TBR-04).

Resource	Applicable Element	Attainment
		Proposed harvest systems were not chosen strictly on the basis of providing the greatest dollar return, rather they were primarily based upon trending forest vegetation toward desired Forest Plan conditions (FW-STD-TBR-05). Clearcutting with reserves followed by planting is proposed only where it is the optimum method for meeting Forest Plan direction (FW-STD-TBR-06) and would only be used where there is enough volume available to warrant harvesting and there is no other viable regeneration method. Clearcutting is proposed on sites dominated by the grand fir/cedar/mountain hemlock dominance group, desirable early seral, shade intolerant, drought and fire tolerant, insect and disease resistant species (western larch and western white pine) are generally absent to retain as a component of residual stands. Even-aged prescriptions other than clearcutting are proposed, in stands that have a component of desirable early seral species, to increase the quantity of seedling/sapling size class and amount of western larch, western white pine dominance types within the project area (FW-STD-TBR-07), the combination of which will trend forested ecosystem within the project area toward the desired conditions listed in the Forest Plan. All acres of proposed harvest in MA6 would occur on suitable lands (MA6-STD-TBR-01). No proposed treatments that harvest timber are scheduled on unsuitable lands (MA6-STD-TBR-02).
Forest Vegetation	**Guidelines** FW-GDL-VEG-01 FW-GDL-VEG-02 FW-GDL-VEG-03 FW-GDL-VEG-04 FW-GDL-VEG-05 FW-GDL-VEG-06 FW-GDL-VEG-07 FW-GDL-VEG-08 FW-GDL-TBR-01	**Proposed Action:** The proposed action would be consistent with all relevant vegetation guidelines. No activities are proposed in old growth stands (FW-GDL-VEG-01). No new permanent or temporary road construction is proposed in old growth (FW-GDL-VEG-02). Trees retained through retention associated with the harvest prescriptions would provide future recruitment of snags and course woody debris (FW-GDL-VEG-03, FW-GDL-VEG-04). Silviculture prescriptions would be consistent with silvicultural direction (FW-GDL-VEG-05, FW-GDL-VEG-06). Proposed activity areas have been surveyed for TES plants as necessary, and protection measures would be implemented to protect known locations of TES plants (FW-GDL-VEG-07). The proposed action utilizes silvicultural practices that would trend the forest vegetation towards conditions that are more resistant and resilient to disturbances and stressors, including climate change (FW-GDL-VEG-08).
Timber Production and Socio-Economics	**Goals, Desired Conditions, and Objectives** GOAL-TBR-01 GOAL-SES-01 FW-DC-TBR-01 FW-DC-SES-01 FW-DC-SES-02 FW-DC-SES-03 FW-OBJ-TBR-01	**Proposed Action:** The proposed action would result in the commercial sale of timber, making progress towards contributing to the social and economic well-being of local communities and providing a sustainable level of timber products for current and future generations, trending toward the Forest Plan goals (GOAL-TBR-01, GOAL-SES-01), applicable desired conditions (FW-DC-TBR-01, FW-DC-SES-01, FW-DC-SES-02, FW-DC-SES-03) and objectives (FW-OBJ-TBR-01) of the Forest Plan.
Timber Production and Socio-Economics	**Standards and Guidelines**	There are no standards or guidelines associated with timber production and socio-economics.
Fire and Air Quality	**Goals, Desired Conditions, and Objectives** FW-DC-FIRE-01 FW-DC-FIRE-02 FW-DC-FIRE-03 FW-OBJ-FIRE-01 FW-DC-AQ-01	**Proposed Action:** The proposed action would improve fire behavior characteristics on treated areas and therefore improve public and firefighter safety in the event of a wildfire in the project area (FW-DC-FIRE-01 and FW-DC-FIRE-02). Through timber harvest and subsequent treatment of activity fuels, hazardous fuels are reduced (FW-DC-FIRE-02). Planned ignitions would help trend vegetation toward the desired conditions while serving other important ecosystem functions (FW-DC-FIRE-03). The proposed action would make a contribution to the Forest Plan objective of treating fuels on approximately 6,000 to 16,000 acres annually on NFS lands by treating over 1,400 acres of fuels over the course of the project

Resource	Applicable Element	Attainment
		(FW-OBJ-FIRE-01). Reducing fuels available to a wildfire, as well as burning when conditions favor good smoke dispersion, will help the Forest meet desired conditions for air quality in Class 1 airsheds and non-attainment areas (FW-DC-AQ-01).
Fire and Air Quality	**Standards**	There are no Forest Plan Standards associated with fire or air quality.
Fire and Air Quality	**Guidelines** MA4a-GDL-FIRE-01 MA6-GDL-FIRE-01 FW-GDL-AQ-01	No prescribed fire is being proposed in the Theriault Lake RNA because it is not identified in the RNA Establishment Record (ER), or in an approved RNA management plan (MA4a-GDL-FIRE-01). The ER expressly states (p. 15); *"Fires will be confined, contained, and controlled to prevent fire loss of trees. Prescribed fire will not be used because this RNA is largely old growth of mountain hemlock which is highly subject to fire damage."* **Proposed Action:** In accordance with Forest Plan guidelines for MA6, the proposed action would reduce fuels through timber harvest and burning (MA6-GDL-FIRE-01). Because the IPNF strictly complies with the recommendations provided by air quality regulating agencies when conducting prescribed burning activities, the project would be consistent with the air quality guideline (FW-GDL-AQ-01).
Watershed, riparian, aquatic habitat and species	**Goals, Desired Conditions, and Objectives** GOAL-WTR-01 GOAL-RIP-01 GOAL-AQH-01 GOAL-AQS-01 FW-DC-WTR-01 FW-DC-WTR-02 FW-DC-WTR-03 FW-DC-RIP-01 through FW-DC-RIP-05 FW-DC-AQH-05 FW-OBJ-WTR-01 FW-OBJ-WTR-02	**Proposed Action:** Proposed aquatic restoration activities would complement past restoration efforts and continue to improve watershed condition by reducing sedimentation and water temperature thus trending streams and riparian areas towards Forest Plan goals (GOAL-WTR-01, GOAL-RIP-01, GOAL-AQH-01, GOAL-AQS-01) and applicable desired conditions (FW-DC-WTR-01, FW-DC-WTR-02, FW-DC-WTR-03, FW-DC-RIP-01 through FW-DC-RIP-05, FW-DC-AQH-05).
Watershed, riparian, aquatic habitat and species	**Standards** FW-STD-WTR-01 FW-STD-RIP-01 FW-STD-RIP-02 FW-STD-RIP-03	**Proposed Action:** As a result of design features and BMPs in particular, the proposed action would be consistent with applicable standards for watershed, riparian and aquatic species. There are no designated special or public water supplies in the project area watersheds (FW-STD-WTR-01) however there is a domestic pond. Proposed road decommissioning and storage activities in the RHCAs would help promote these sites toward desired conditions. These may have short term effects due to increased turbidity and sediment delivery, but would show long-term benefits by removing road/stream connections and obliterating roads within the RHCAs (FW-STD-RIP-02). INFISH direction and terms and conditions in the Biological Opinion (USFWS, 1998) would be applied (FW-STD-RIP-03); see also the discussion of consistency with the Inland Native Fish Strategy.
Watershed, riparian, aquatic habitat and species	**Guidelines** FW-GDL-WTR-01 FW-GDL-WTR-02 FW-GDL-RIP-01 FW-GDL-RIP-05	**Proposed Action:** As a result of design features and BMPs, the Proposed Action would be consistent with applicable guidelines for watershed, riparian and aquatic species. Proposed activities would improve water quality in project area streams over the long term by decreasing sediment delivery, increase pool depth, and overstory shading, thereby decreasing water temperature (FW-GDL-WTR-01). Decommissioned and stored roads would be hydrologically inert after treatment due to design features and Best Management Practices (FW-GDL-WTR-02). Routine road maintenance would follow applicable BMPs; soil and snow would not be side-cast into surface waters (FW-GDL-RIP-01).
Soils	**Goals, Desired**	**Proposed Action:** As a result of design features and BMPs in particular,

Resource	Applicable Element	Attainment
	Conditions, and Objectives GOAL-SOIL-01 FW-DC-SOIL-01 FW-DC-SOIL-02 FW-DC-SOIL-03 FW-OBJ-SOIL-01	the proposed action would be neutral toward the forest wide goal (GOAL-SOIL-01) and desired conditions (FW-DC-SOIL-01 through FW-DC-SOIL-03) for soils, and would not prevent the attainment of any applicable objectives (FW-OBJ-SOIL-01).
Soils	**Standards**	There are no standards associated with soils.
Soils	**Guidelines** FW-GDL-SOIL-01 through FW-GDL-SOIL-04	**Proposed Action:** The project is designed to be consistent with forest wide guidelines for soils. By implementing the soil-related design features, the proposed action would meet the Region 1 Soil Quality Standards and therefore be consistent with all Forest Plan soil guidelines.
Wildlife	**Goals, Desired Conditions, and Objectives** GOAL-WL-01 GOAL-WL-02 FW-DC-WL-10 through FW-DC-WL-14	**Proposed Action:** The proposed action would help trend conditions toward forest wide goals (GOAL-WL-01, GOAL-WL-02) and desired conditions. Management activities proposed in the riparian areas are designed for long-term benefit and would help promote these sites toward desired conditions (FW-DC-WL-11). No road construction or other activities are proposed within old growth (FW-DC-WL-12). Design of activities would help to avoid or minimize disturbance to species and their habitat (FW-DC-WL-13, FW-DC-WL-14). Activities would result in a trend toward the desired conditions for forest vegetation, thereby providing habitat for native fauna adapted to open forests and early seral habitats (or whose life/natural history and ecology are partially provided by those habitats), and wildlife habitat would be improved over the long-term (FW-DC-WL-10). Activities would not prevent attainment of Forest Plan objectives for wildlife.
Wildlife	**Standards**	There are no applicable standards associated with wildlife.
Wildlife	**Guidelines** FW-GDL-WL-20 FW-GDL-WL-22	**Proposed Action:** Based on current conditions, unit location and layout, and application of design features such as buffers and timing of activities, the proposed action is designed in accordance with and would meet the intent of all applicable wildlife guidelines for raptors (FW-GDL-WL-20) and wolves (WL-GDL-WL-22).
Access, recreation and scenic quality	**Goals, Desired Conditions, and Objectives** GOAL-AR-01 FW-DC-AR-02 FW-DC-AR-03 FW-DC-AR-04 FW-DC-AR-05 FW-DC-AR-07 FW-OBJ-AR-04 FW-OBJ-AR-05	**Proposed Action:** The Homestead project area would continue to provide year-round outdoor recreation opportunities and experiences in a range recreational activities and settings (FW-DC-AR-03, FW-DC-AR-04). Scenic resources would complement those settings and experiences while reflecting healthy and sustainable ecosystem conditions (FW-DC-AR-02). The transportation system would continue to provide safe and efficient public and administrative access to the Forest (FW-DC-AR-07). Motorized trail travel will continue to be provided. Non-motorized trail opportunities will continue to be provided in the upper St. Joe area with no change in the Homestead project area (FW-DC-AR-05). Winter and summer trail maintenance objectives will be met (FW-OBJ-AR-04, FW-OBJ-AR-05).
Access, recreation and scenic quality	**Standards**	There are no applicable standards associated with access or recreation.
Access, recreation and scenic quality	**Guidelines** MA6-GDL-AR-04 MA6-GDL-AR-05	**Proposed Action:** The Homestead project would meet the Scenic Integrity Objectives of Moderate and High as set forth in the Forest Plan in the long term in MA 6. No activities are proposed within MA4.
Cultural resources	**Goals, Desired Conditions, and Objectives** FW-DC-CR-01	**Proposed Action:** An appropriate inventory has been completed of proposed activity areas in the Homestead project area (FW-DC-CR-01, FW-OBJ-CR-01); Four new sites and nine previously known sites were recorded and updated during survey of the Homestead Project.

Resource	Applicable Element	Attainment
	FW-OBJ-CR-01	
Cultural resources	**Standards**	There are no standards associated with cultural resources.
Cultural resources	**Guidelines** FW-GDL-CR-01	**Proposed Action:** The project would meet guidelines for cultural resources. All contracts of work in relation to this project would include language for the protection of National Register-listed or eligible properties, either known or located through inadvertent discovery, and would include language protection and preservation protocols for any inadvertent discover of human remains. Proposed activities would not impact treaty rights and/or cultural sites or cultural use.
Sensitive Plants	**Goals, Desired Conditions, and Objectives** FW-DC-VEG- 09	**Proposed Action:** Through adherence to Forest Plan guidelines for vegetation and soils, the proposed activities would move the project area toward desired conditions; this would contribute to retention or restoration of ecological conditions and processes that sustain the habitats currently or potentially supporting sensitive plant populations (FW-DC-VEG-09). Relevant Forest Plan direction includes maintaining and increasing old growth representation on the forest (FW-VEG-DC-03), i.e., via exclusion of old growth and recently logged stands and by selectively harvesting currently overrepresented tree species (FW-DC-VEG-11, FW-GLD-VEG-08); this would benefit various sensitive plant species associated with old growth/ mature stand conditions. Leaving down wood of various species, sizes, and stages of decay (FW-DC-VEG-08; FW-GDL-VEG-03; FW-GDL-SOILS-02) and maintaining soil integrity and hydrology and minimizing compaction (FW-DC-SOILS-01, -02, 03; FW-GDL-SOILS-01, -02, -03) would contribute to conditions associated with sensitive species reliant on underground fungal networks, which are supported by deep duff layers and rotting wood; sensitive mosses that occur on downed wood would also benefit.
Sensitive Plants	**Standards**	There are no standards associated with sensitive plants.
Sensitive Plants	**Guidelines** FW-GDL-VEG- 07	**Proposed Action:** An appropriate evaluation has been completed of proposed activity areas in the Homestead project area (FW-DC-VEG-09) for the presence of occupied or suitable habitat for plant species listed under the Endangered Species Act or on the Regional Forester's sensitive species list for Region 1. No threatened or endangered species or their habitat are present in the project area; no sensitive plant species are present in the project area.

Table A-2: Consistency with the Inland Native Fish Strategy

Applicable Plan Element	Attainment
Standard widths defining interim RHCAs	All categories of streams and other aquatic features in the project area have been protected accordingly, as part of the design features. Any features identified during implementation that were not identified would also be protected as appropriate.
Timber management	Vegetation management activities within the INFISH buffers are designed to meet desired conditions and have long term positive habitat trends.
Roads management	Road decommissioning and storage activities occurring with the INFISH buffers may have a short term effects due to increased turbidity and sediment delivery, but would show long term benefits by removing road/stream connections and obliterating roads within the INFISH buffers.
Fire/Fuels Management	There are no proposed prescribed burns located in the RHCAs, and site preparation outside of RHCAs would not prevent attainment of RMOs.
General Riparian Area Management	The riparian units would be harvested from the existing road system and if any additional entry points are needed, these would be at designated locations by the sale administrator.

Appendix B- Resource Specific Activities

Vegetation Tables

Table B-1: Vegetation Specific Activities

Unit ID	Treatment Type	Treatment Acres	Logging System	Slash Treatment/Yarding	Temporary Road (miles)
1A	Seed-Tree	11	GB	Yard Tops/Grapple Pile	
1B	Seed-Tree	18	TLM	Yard Tops/Broadcast Burn	
2A	Clearcut with Reserves	5	GB	Yard Tops/Grapple Pile	
2B	Shelterwood	8	SL	Yard Tops/Broadcast Burn	
3	Irregular Shelterwood	16	GB	Yard Tops/Grapple Pile	0.26
4	Shelterwood	16	GB	Yard Tops/Grapple Pile	0.22
5A.1	Seed-Tree	29	GB	Yard Tops/Grapple Pile	
5A.2	Clearcut with Reserves	9	GB	Yard Tops/Broadcast Burn	
5A.3	Shelterwood	30	GB	Yard Tops/Grapple Pile	0.03
6A	Shelterwood	9	GB	Yard Tops/Grapple Pile	0.26
6B	Shelterwood	25	TLM	Yard Tops/Broadcast Burn	
7	Shelterwood	27	TLM	Yard Tops/Jackpot Burn	0.15
8	Shelterwood	36	GB	Yard Tops/Grapple Pile	
9A	Clearcut with Reserves	10	GB	Yard Tops/Jackpot Burn	
9B	Shelterwood	8	TLM	Yard Tops/Broadcast Burn	
10	Shelterwood	26	GB	Yard Tops/Grapple Pile	0.06
11A	Shelterwood	20	GB	Yard Tops/Grapple Pile	
11B	Clearcut with Reserves	10	TLM	Yard Tops/Broadcast Burn	
12	Shelterwood	24	GB	Yard Tops/Grapple Pile	

Unit ID	Treatment Type	Treatment Acres	Logging System	Slash Treatment/Yarding	Temporary Road (miles)
13	Shelterwood	8	GB	Yard Tops/Grapple Pile	0.03
14	Shelterwood	28	GB	Yard Tops/Grapple Pile	0.1
15	Commercial Thin	24	SL	Yard Tops/Broadcast Burn	0.25
16A	Commercial Thin	19	GB	Yard Tops/Grapple Pile	
16B	Shelterwood	24	GB	Yard Tops/Broadcast Burn	
17	Shelterwood	12	GB	Yard Tops/Broadcast Burn	
18A	Clearcut with Reserves	15	SL	Yard Tops/Broadcast Burn	0.09
18B	Seed-Tree	19	SL	Yard Tops/Broadcast Burn	
19	Clearcut with Reserves	19	GB	Yard Tops/Jackpot Burn	
20	Shelterwood	36	GB	Yard Tops/Grapple Pile	0.24
21	Seed-Tree	85	GB	Yard Tops/Grapple Pile	0.32
22	Seed-Tree	18	GB	Yard Tops/Grapple Pile	0.10
23	Commercial Thin	7	GB	Yard Tops/Grapple Pile	0.03
24	Shelterwood	16	GB	Yard Tops/Grapple Pile	
25A	Seed-Tree	41	GB	Yard Tops/Grapple Pile	0.11
25B	Seed-Tree	13	SL	Yard Tops/Broadcast Burn	
26	Irregular Shelterwood	51	GB	Yard Tops/Grapple Pile	0.05
27	Irregular Shelterwood	27	GB	Yard Tops/Grapple Pile	
28	Clearcut with Reserves	28	GB	Yard Tops/Grapple Pile	0.03
29	Shelterwood	44	GB	Yard Tops/Grapple Pile	0.27
30	Seed-Tree	92	GB	Yard Tops/Grapple Pile	
31A	Seed-Tree	20	GB	Yard Tops/Grapple Pile	

Unit ID	Treatment Type	Treatment Acres	Logging System	Slash Treatment/Yarding	Temporary Road (miles)
31B	Seed-Tree	29	SL	Yard Tops/Broadcast Burn	
32A	Clearcut with Reserves	6	GB	Yard Tops/Grapple Pile	
32B	Clearcut with Reserves	19	SL	Yard Tops/Broadcast Burn	
33	Clearcut with Reserves	9	GB	Yard Tops/Grapple Pile	
34	Clearcut with Reserves	36	GB	Yard Tops/Grapple Pile	
35	Clearcut with Reserves	20	SL	Yard Tops/Broadcast Burn	
36B.1	Clearcut with Reserves	40	SL	Yard Tops/Broadcast Burn	
36B.2	Clearcut with Reserves	18	SL	Yard Tops/Broadcast Burn	
37	Seed-Tree	8	SL	Yard Tops/Broadcast Burn	
40	Shelterwood	33	GB	Yard Tops/Grapple Pile	0.22
42.1	Clearcut with Reserves	10	GB	Yard Tops, TBD	
42.2	Clearcut with Reserves	10	GB	Yard Tops, TBD	

Road Tables

Table B-2: New Road Construction

New Construction	Mile Post to Mile Post	Total
NC-1	0.0 – 0.2	0.16
NC-2	0.0 – 2.6	2.61
NC-3	0.0 – 0.4	0.45
NC-4	0.0 – 0.7	0.69
NC-6	0.0 – 0.2	0.18
Total New construction miles		**4.09**

Table B-3: System Roads to be Added

Existing Road Prescription	Proposed Road Prescription	Road Number	Mile Post to Mile Post	Proposed Action Miles
Non-system Road	Admin use only	1914UAD	0.00 – 0.11	0.11
Non-system Road	Admin use only	1914UAD	0.55 – 0.80	0.25
Non-system Road	Add to System and Store	1914UAH	0.00 – 0.37	0.37
Non-system Road	Open to the Public	1914UB	0.00 – 0.50	0.50
Non-system Road	Open to the Public	1914UC	0.00 – 1.35	1.35
Non-system Road	Add to System and Store	1914UD	0.00 - 0.70	0.70
Non-system Road	Open to the Public	1914UE	0.00 – 0.46	0.46
Non-system Road	Add to System and Store	1914UF	0.00 – 0.32	0.32
Non-system Road	Admin use Only	1914UK	1.46 – 2.90	1.44
Non-system Road	Add to System and Store	1915UB	0.00 – 0.46	0.46
Non-system Road	Add to System and Store	1936UP	0.00 – 0.31	0.31
Non-system Road	Add to System and Store	1936UPA	0.00 – 0.47	0.47
Non-system Road	Open to the Public	1936UW	0.00 – 0.82	0.82
Non-system Road	Open to the Public	216A	0.00 – 0.26	0.26
Non-system Road	Open to the Public	216B	0.00 – 0.06	0.06
Non-system Road	Open to the Public	321UC	0.00 – 0.06	0.06
Non-system Road	Add to System and Store	480A	0.00 – 2.80	2.80
Non-system Road	Add to System and Store	480UB	0.0 – 1.46	1.46
Non-system Road	Add to System and Store	480UG	0.0 – 0.83	0.83
Non-system Road	Add to System and Store	548UK	0.0 – 0.64	0.64
Non-system Road	Add to System and Close w/Gate	548UA	0.0 – 1.06	1.06

Existing Road Prescription	Proposed Road Prescription	Road Number	Mile Post to Mile Post	Proposed Action Miles
Non-system Road	Add to System and Close w/Gate	548UE	0.0 – 0.18	0.18
Total Road Miles added to NF System				14.92

Table B-4: System Road Reconstruction

System Road Number	Mile Post to Mile Post	Total
1914A	0.0 – 0.64	0.64
1914A	1.35 – 2.07	0.72
1914UAH	0.0 – 0.37	0.37
1914UB	0.0 – 0.50	0.50
1914UC	0.0 – 1.35	1.35
1914UD	0.0 – 0.70	0.70
1914UE	0.0 – 0.46	0.46
1914UF	0.0 – 0.31	0.31
548	0.0 – 0.88	0.88
Total Reconstruction miles	N/A	**5.93**

Table B-5: Temporary Roads

Temporary Road Number	Length (Miles)
TC-2	0.28
TC-3	0.08
TC-4	0.22
TC-6	0.27
TC-7	0.15
TC-13	0.03
TC-14	0.11
TC-15	0.34
TC-20	0.24
TC-21-1	0.05
TC-21-2	0.38
TC-23	0.04
TC-25	0.11
TC-26	0.05
TC-28	0.03
TC-29	0.27
TC-40	0.22
Total Miles	**2.87**

Table B-6: System Roads to be Maintained

System Road Number	Mile Post to Mile Post	Total
216	0.0 –5.80	5.80
321	12.16 – 29.76	17.60
548	0.0 – 0.88	0.88
1913	0.0 –1.32	1.32
1914A	0.0 – 0.64	0.64
1914A	1.35 – 2.07	0.72
Total Road Maintenance (Miles)		**26.96**

Table B-7. Closed Road Prescriptions

Existing Road Prescription	Proposed Road Prescription	Road Number	Mile Post to Mile Post	Proposed Action Miles
Closed w/Gate	Closed w/Gate	1913	0.0 – 1.14	1.14
Sub-total Storage – Currently Restricted	N/A	N/A	N/A	0.0

Table B-8: System Roads to be Decommissioned

Existing Road Status	Proposed Road Status - Decommission	Roads	Beginning Mile Post	Proposed Action Miles
Barriered	Re-contoured	1914A	0.64	0.71
Open	Partial Re-contour	1936E	0.70	0.65

Table B-9: Non-system Roads to be Decommissioned

Existing Road Status	Proposed Road Status - Decommission	Roads	Beginning Mile Post	Proposed Action Miles
Undetermined	Not Needed	1914UAG	0.0	0.16
Undetermined	Not Needed	1914UF	0.32	0.22
Undetermined	Not Needed	1914UG	0.0	0.84
Undetermined	Not Needed	1914UH	0.0	1.10
Undetermined	Not Needed	1914UQ	0.0	0.04
Undetermined	Not Needed	1914US	0.0	0.44
Undetermined	Not Needed	1914UT	0.0	0.70
Undetermined	Not Needed	1914UU	0.0	0.53
Undetermined	Not Needed	1914UV	0.0	1.50
Undetermined	Not Needed	1914UX	0.0	0.47
Undetermined	Not Needed	1914UXA	0.0	0.20
Undetermined	Not Needed	1915UA	0.0	0.30
Undetermined	Not Needed	1915UC	0.0	0.11
Undetermined	Not Needed	1915UD	0.0	0.26

Existing Road Status	Proposed Road Status - Decommission	Roads	Beginning Mile Post	Proposed Action Miles
Undetermined	Not Needed	1936UAA	0.0	0.14
Undetermined	Not Needed	1936UAB	0.0	0.22
Undetermined	Not Needed	1936UAC	0.0	0.14
Undetermined	Not Needed	1936UAD	0.0	0.17
Undetermined	Not Needed	1936UAF	0.0	0.73
Undetermined	Not Needed	1936UAG	0.0	0.34
Undetermined	Not Needed	1936UAH	0.0	0.37
Undetermined	Not Needed	1936UN	0.0	0.48
Undetermined	Not Needed	1936UP	0.31	0.34
Undetermined	Not Needed	1936UR	0.0	0.52
Undetermined	Not Needed	1936URA	0.0	0.39
Undetermined	Not Needed	1936UX	0.0	0.70
Undetermined	Not Needed	1936UY	0.0	0.70
Undetermined	Not Needed	1936UXA	0.0	0.40
Undetermined	Not Needed	1936UZ	0.0	0.66
Undetermined	Not Needed	216B	0.06	0.98
Undetermined	Not Needed	216UA	0.0	1.15
Undetermined	Not Needed	216UB	0.0	0.23
Undetermined	Not Needed	216UM	0.0	0.48
Undetermined	Not Needed	216UN	0.0	1.25
Undetermined	Not Needed	321UF	0.0	0.75
Undetermined	Not Needed	480UA	0.0	0.20
Undetermined	Not Needed	480UC	0.0	0.30
Undetermined	Not Needed	480UD	0.0	0.38
Undetermined	Not Needed	480UE	0.0	0.24
Undetermined	Not Needed	480UF	0.0	0.52
Undetermined	Not Needed	480UK	0.0	0.60
Undetermined	Not Needed	480UL	0.0	0.51
Undetermined	Not Needed	480UM	0.0	0.55
Undetermined	Not Needed	490UW	0.0	0.46
Undetermined	Not Needed	548AUA	0.0	0.23
Undetermined	Not Needed	548AUB	0.0	0.18
Undetermined	Not Needed	548UB	0.0	0.67
Undetermined	Not Needed	548UC	0.0	0.60
Undetermined	Not Needed	548UD	0.0	0.33
Undetermined	Not Needed	548UF	0.0	0.50
Undetermined	Not Needed	548UG	0.0	0.36

Existing Road Status	Proposed Road Status - Decommission	Roads	Beginning Mile Post	Proposed Action Miles
Undetermined	Not Needed	548UH	0.0	0.19
Undetermined	Not Needed	548UJ	0.0	0.30
Undetermined	Not Needed	548UL	0.0	0.14
Undetermined	Not Needed	548UM	0.0	1.50
Undetermined	Not Needed	548UP	0.0	0.26
Undetermined	Not Needed	548UQ	0.0	0.14
Undetermined	Not Needed	548UR	0.0	1.20
Undetermined	Not Needed	548US	0.0	0.30
Undetermined	Not Needed	548UT	0.0	2.00
Undetermined	Not Needed	548UU	0.0	0.80
Undetermined	Not Needed	548UV	0.0	0.45
Total Miles Decommissioned	**(B-8+B9)**			**34.42**

Soils Tables

Table B-10: Soils Table

Unit	Logging System	Acres	Existing DSD	DSD added (incl. Skid Trail reuse estimates)	Temp Road DSD (post-rehab)	Potential Recovery due to Soil Rehabilitation	Cumulative DSD (Post harvest and Rehab)
1A.1	GB/W	**8.0**	**3%**	10%	0%	**0%**	**13%**
1A.2	GB/CTL	**2.8**	**3%**	12%	0%	**0%**	**15%**
1B	TLM	17.5	0%	13%	1%		14%
2	SKY	12.4	4%	3%	0%	0%	7%
3	GB	15.5	3%	12%	~2%		15%
4	GB	15.9	0%	13%	~2%		13%
5A.1	GB/W	28.9	**7%**	7%	0%	1%	14%
5A.2	GB/W	9.2	10%	6%	0%	1%	15%
5A.3	GB/W	29.6	**7%**	7%	0%	1%	13%
6A	GB	8.8	0%	13%	0%		13%
6B	SKY	25.0	3%	3%	0%		6%
7	**TLM**	**27.4**	**4%**	3%	3%		10%
8	GB	36.3	0%	13%	1%		14%
9A	*GB*	*10.2*	*0%*	13%	1%		14%
9B	*SKY*	*8.0*	*3%*	3%	0%		6%
10	GB	26.3	0%	13%	0%		13%
11A*	GB	20.4	0%	13%	0%		13%
11B*	TLM	9.6	0%	13%	0%		13%
12*	GB	23.5	0%	13%	0%		13%
13*	GB	7.8	0%	13%	0%		13%
14*	GB	24.9	0%	13%	0%		13%
15*	SKY	23.8	0%	3%	4%		7%
16A*	GB	19.8	0%	13%	0%		13%
16B*	TLM	20.0	0%	13%	0%		13%

Unit	Logging System	Acres	Existing DSD	DSD added (incl. Skid Trail reuse estimates)	Temp Road DSD (post-rehab)	Potential Recovery due to Soil Rehabilitation	Cumulative DSD (Post harvest and Rehab)
17*	GB	12.4	0%	13%	0%		13%
18A*	SKY	14.9	7%	3%	0%		10%
18B*	SKY	19.4	7%	3%	1%		11%
19*	GB	18.5	0%	13%	0%		13%
20	**GB/W**	**35.9**	**33%**	**33%**	**~1%**	**1%**	**32%**
21	**GB/W**	**84.6**	**28%**	**28%**	**~0%**	**1%**	**27%**
22	**GB/W**	**18.4**	**27%**	**27%**	**1%**	**2%**	**26%**
23	GB/W	6.8	**3%**	9%	1%		12%
24	GB	15.9	3%	12%	2%	1%	17%
25A	GB/W	40.5	11%	2%	~0%	0%	13%
25B*	SKY	13.1	0%	3%	0%		3%
26	GB	50.6	5%	10%	0%	0%	14%
27*	GB	27.3	0%	13%	0%		13%
28	GB	27.7	8%	8%	~0%	1%	15%
29	GB	44.0	3%	12%	~2%		15%
30	GB	92.4	7%	8%	0%		15%
31A	GB	20.0	0%	13%	0%		13%
31B	SKY	28.9	0%	3%	0%		3%
32A	GB	6.1	0%	13%	0%		13%
32B	TLM	18.8	0%	13%	0%		13%
33	GB	8.9	5%	9%	1%		15%
34*	GB	36.2	7%	9%	0%	0%	15%
35*	SKY	19.7	0%	3%	0%		3%
36B.1*	SKY	40.1	0%	3%	0%		3%
36B.2*	SKY	18.2	0%	3%	3%		6%
37B	SKY	8.1	0%	3%	1%		4%
40	GB	32.9	3%	12%	~2%		15%

Unit	Logging System	Acres	Existing DSD	DSD added (incl. Skid Trail reuse estimates)	Temp Road DSD (post-rehab)	Potential Recovery due to Soil Rehabilitation	Cumulative DSD (Post harvest and Rehab)
42.1*	GB	10.2	0%	13%	0%		13%
42.2*	GB	17.8	0%	13%	0%		13%

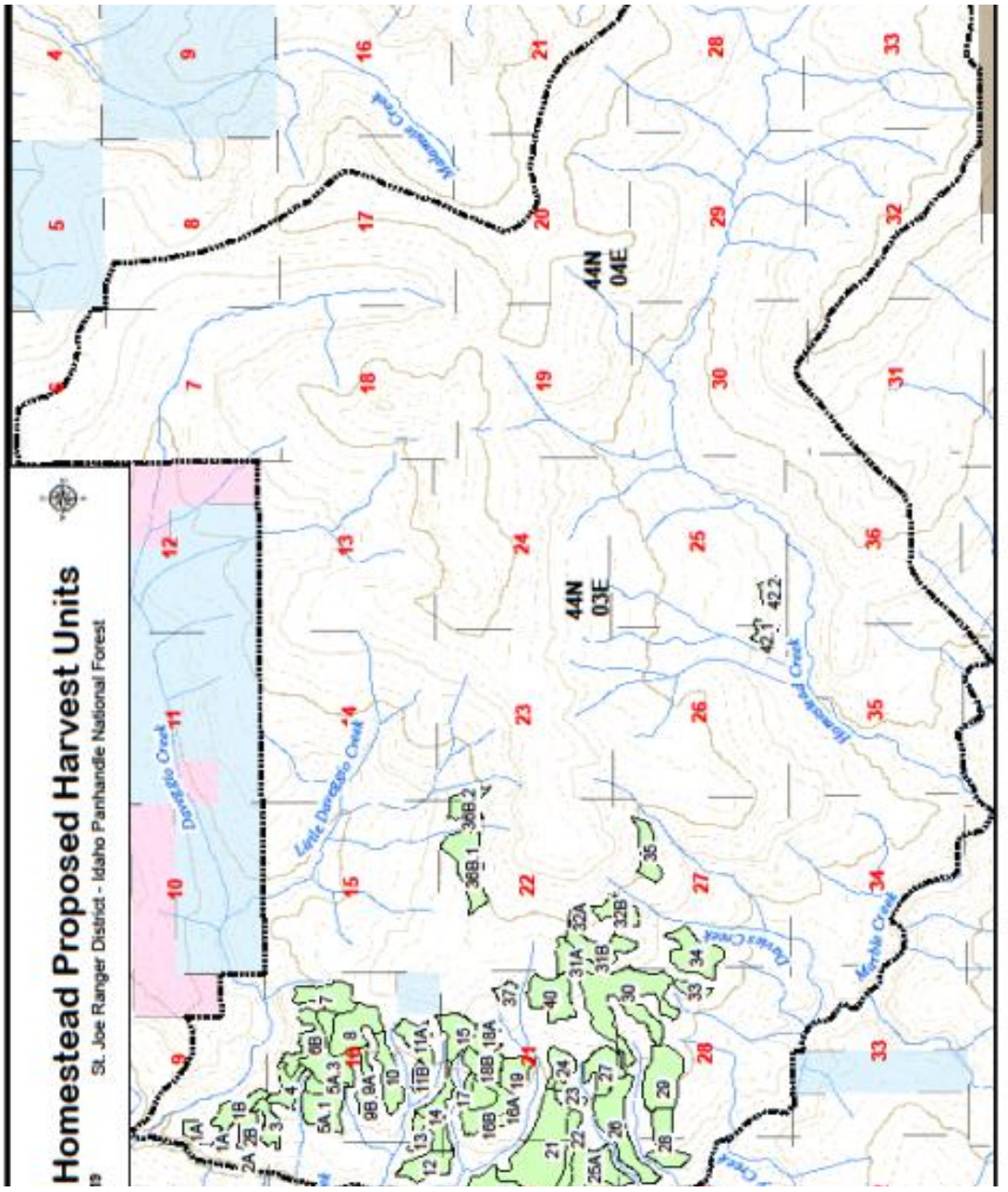
**Existing DSD estimate was extrapolated from other surveyed units with similar field observations and LiDAR observations.*

The temporary roads template already exists on the landscape in these units and is therefore accounted for in the existing DSD estimate. As such, this percentage is not added to the Cumulative DSD calculation. This number is reported in order to get an idea of what this imprint of the temporary road will be, and be able to account for its rehabilitation.

***This table only includes those values that were included in the final Cumulative DSD estimate. To see a further breakdown of disturbance calculations, such as estimated percentage of skid trail reuse and area impacted by temporary roads for each unit, please see the project record (SOIL-004). Also included in the expanded DSD table in the project file is a comments section that describes the design feature(s) to be applied or unit-specific reasoning behind the analysis approach.*

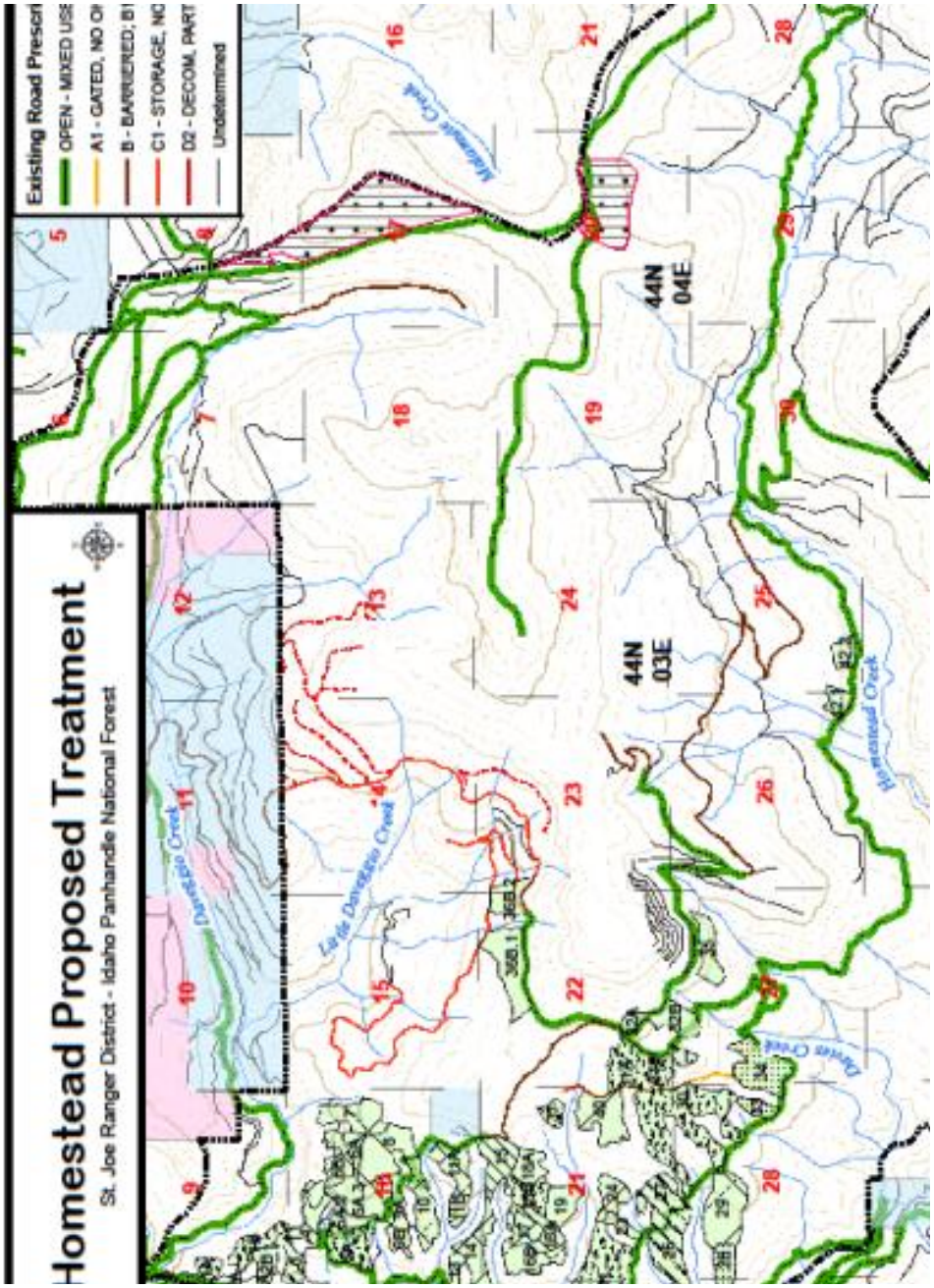
Appendix C- Project Maps

Proposed Harvest Units Map



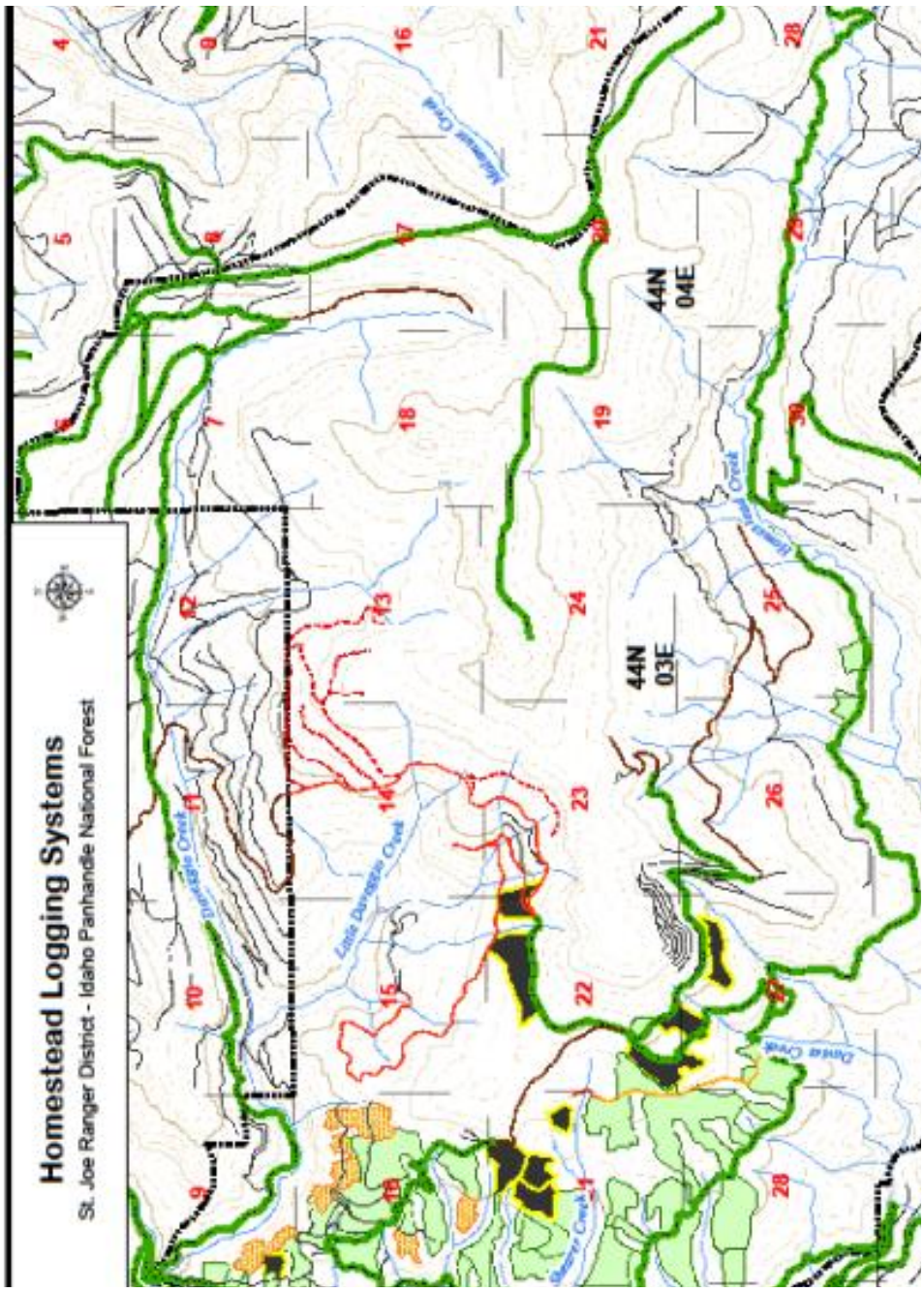
Map C-1: Homestead Proposed Harvest Units

Proposed Treatment Units



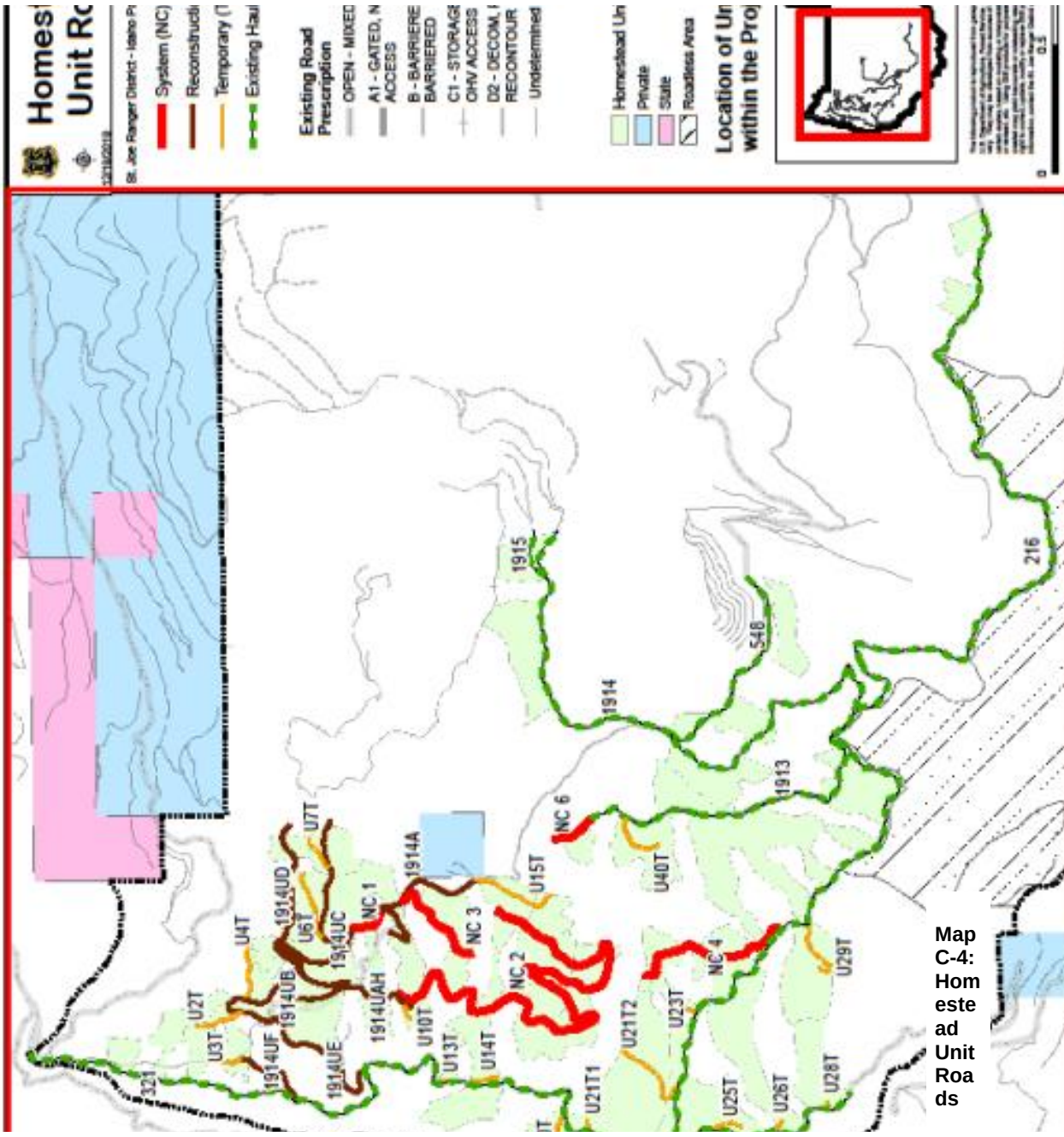
Map C-2: Homestead Proposed Treatment Units

Logging Systems Map



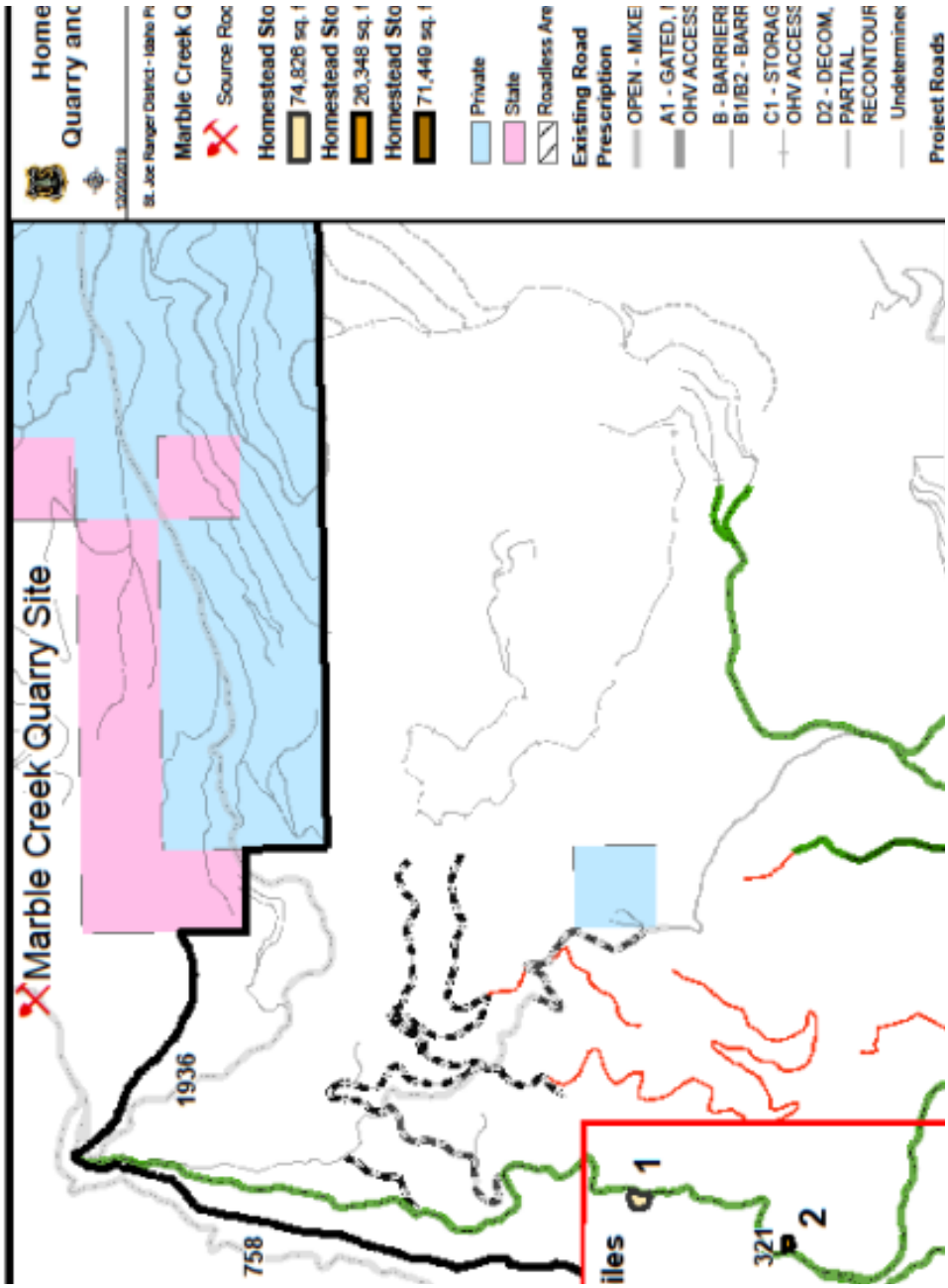
Map C-3: Homestead Logging Systems

Unit Roads Map



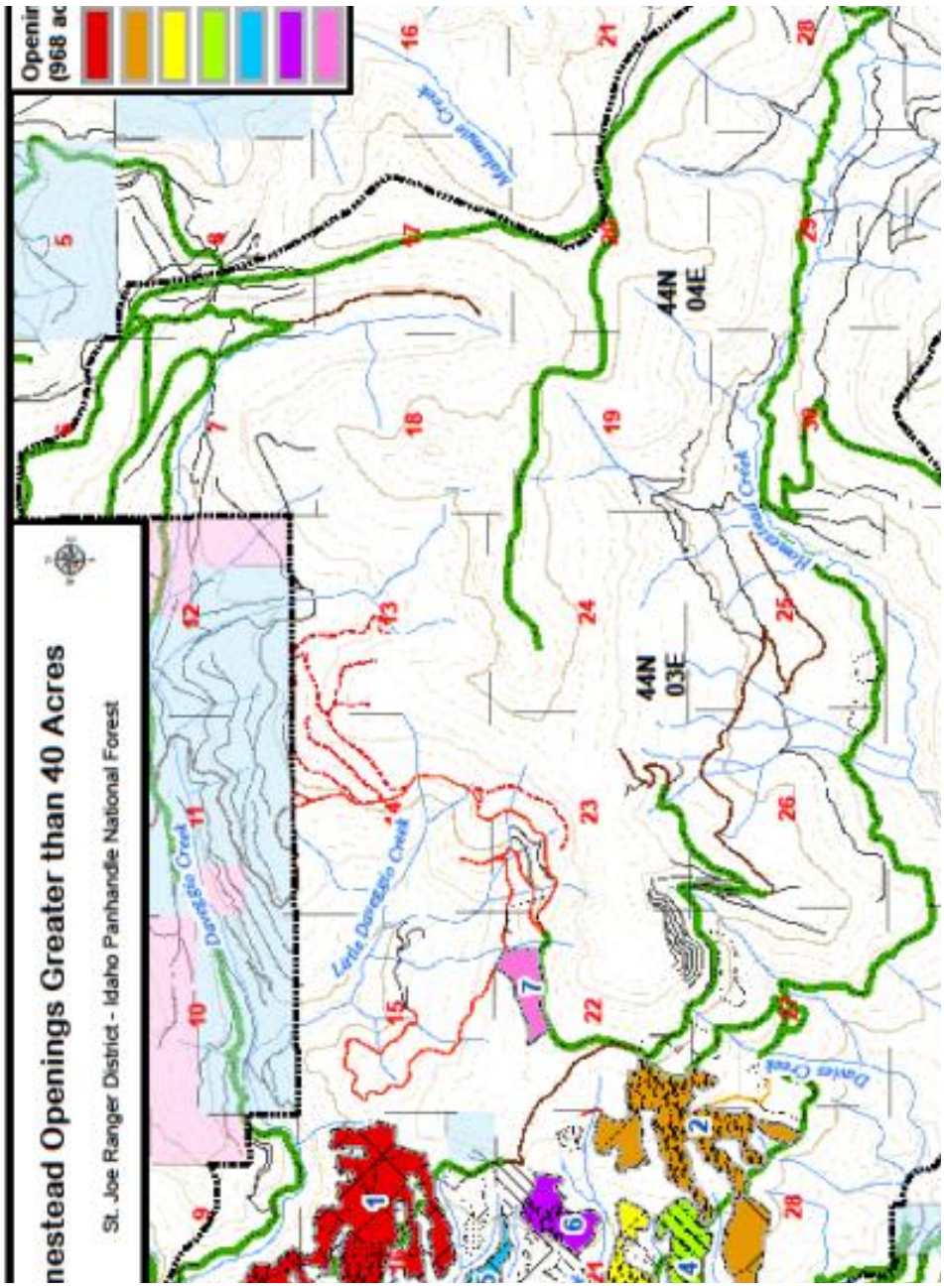
Map C-4: Homestead Unit Roads

Quarry and Rock Stockpile Map



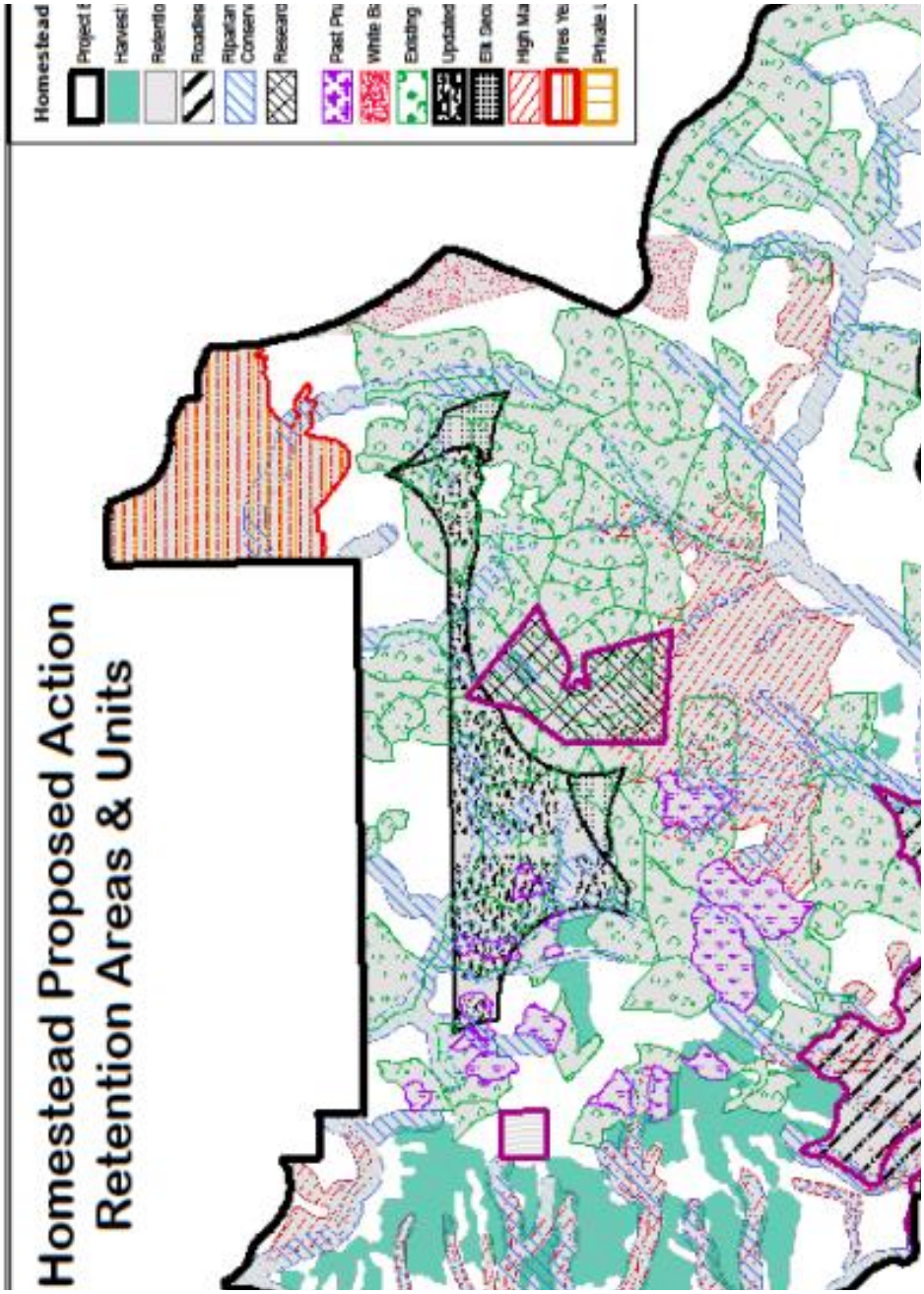
Map C-5: Marble Creek Quarry and Rock Stockpile

Openings Over 40 Acres Map



Map C-6: Homestead Openings Greater Than 40 Acres

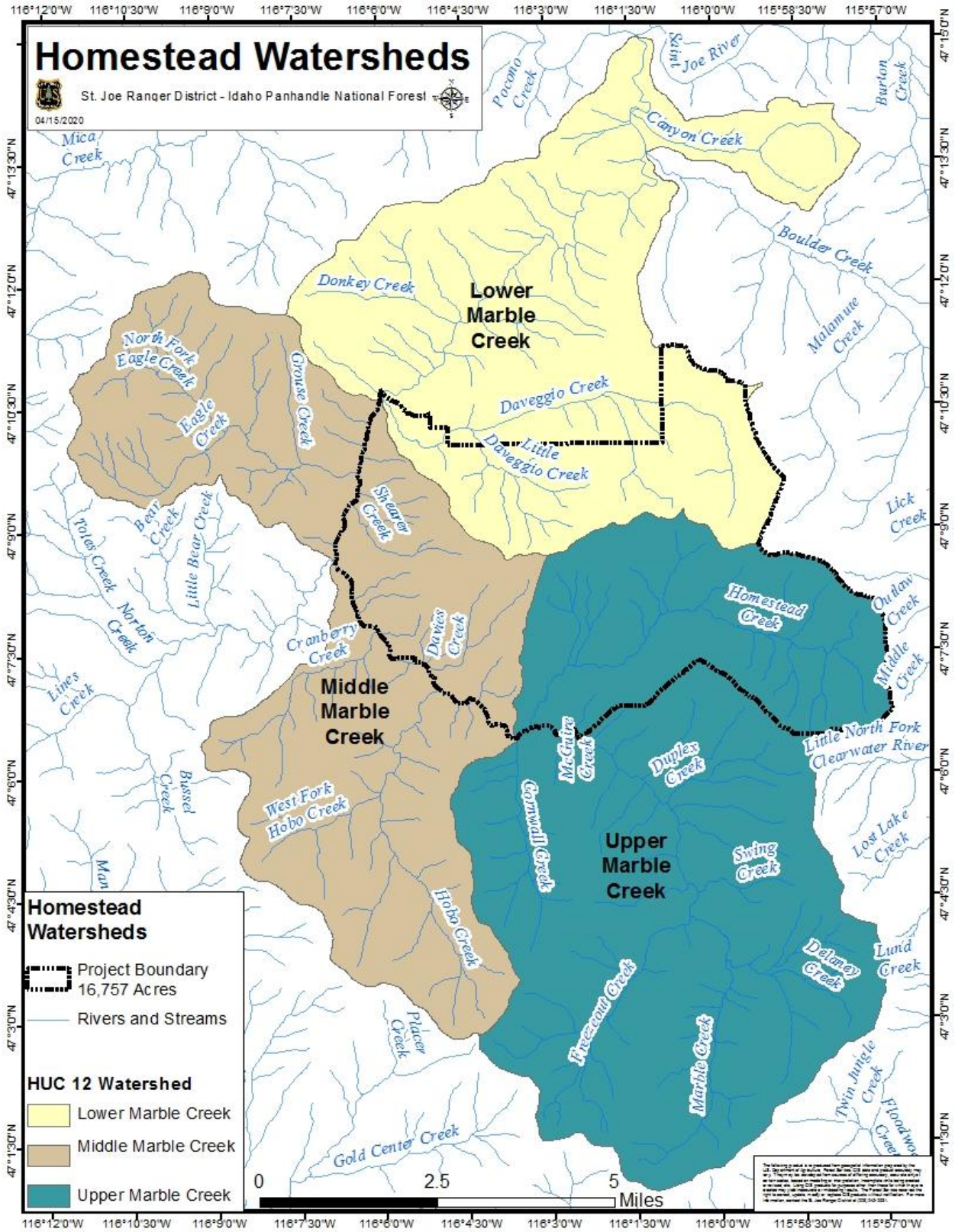
Retention Acres Map



Map C-7: Homestead Proposed Action Retention Areas and Units

Marble Creek Watershed Delineation

Map C-8: Marble Creek Watershed Delineation



Appendix D- Design Features by Resource

The following design features are intended to minimize or mitigate effects to specific resources that may be caused by project activities. In some cases, specific Forest Plan standards or guidelines are listed to ensure certain resources are protected as intended by the Forest Plan. Please refer to the Forest Plan for details.

Fire and Fuels

The purpose of the design features for the fire and fuels resource is to ensure that fire management activities related to the action alternatives have a high probability of success in meeting the silvicultural, air quality, and fuels objectives, as well as being implemented in a safe and efficient manner.

Design Features

1. Directional felling (into the interior of the units) would be used to minimize the amount of activity fuels along unit boundaries.

2. To reduce fuel loading, tops and limbs would be yarded in harvest units wherever possible.

3. Slash pullback, concurrent with harvest, would be done to minimize slash outside of the unit.

4. Slash piles should be constructed free of stumps, soil, snow, and non-woody organic material, and should be burned as dry as practical to enhance efficient combustion.

5. Prescribed burning may occur at any time of year, as prescription parameters, burn windows, and smoke emissions restrictions permit.

6. All burning activities would be conducted according to the requirements of the Montana/ Idaho Smoke Management Unit guidelines outlined in the Montana/Idaho Airshed Group Operating Guide (2010).

7. Where prescribed fire is used as a treatment method, firelines and /or fuel breaks would be constructed as needed, and as determined by fire managers. Topographic and vegetative features of the landscape may also be used for containment of prescribed fires when possible.

8. Schedule of logging will be such that coordination between harvest, burning, and road closure will be timely and efficient. In order to accomplish proposed prescribed burn activities and achieve site preparation requirements most-effectively, logging operations should be completed in such a way that allows units to be released for slash treatment as soon as possible after harvest, and before roads are stored or decommissioned.

Table D 1: Risk Factors and Risk Level With and Without Design Features

Factor	Risk Level without Design Features	Risk Level with Design Features
Landing or Grapple pile burn escapes	Low. Pile burning generally occurs late in the season after recent moisture has precipitated on the outside of piles and surrounding fuels.	Low. With directional felling minimizing material along unit boundaries, and with piles being lit under appropriate weather conditions, risk of escape is low. (DFs #1, #3)
Smoke from landing pile burning creates hazard along open routes	Moderate. Pile burning generally occurs late in the season and may overlap with hunting season.	Low. When piles are constructed cleanly and burned as dry as possible, combustion is fairly efficient, minimizing smoke generation. Piles are burned according to requirements of MT/ID SMU when weather conditions for dispersal are acceptable. (DFs #4, #5, #6)
Wildfire spreads from outside of unit to within unit, or vice versa	High. Without treating activity slash, expected rates of spread post-harvest would be moderate to high, moving quickly through activity slash.	Low. Slash treatments include yarding limbs and tops to landings and burning/removing landings, spot grapple piling, directionally felling along boundaries, as well as prescribed burning. These treatments would isolate and disrupt fuel continuity generated through harvest, and provide effective breaks to fire spread. (DFs #1, 2, 3, 7)
Prescribed fire spreads from within unit to outside unit	High. Fire spread would be difficult to contain without firelines and/or fuel breaks where fuels are continuous.	Low-Moderate. Containment lines would serve to disrupt fuel continuity and keep prescribed fire within desired areas. (DFs #5, #7)
Slash from harvest not treated in a timely fashion	High Slash hazard generated from harvest activities would not be reduced and could present a higher risk for fire spread as well as increase resistance to control. Additionally, implementation costs could also increase.	Low-Moderate. A coordinated schedule of logging would encourage organized harvest operations so units could be released and slash hazard and site preparation activities completed in a timely fashion so that slash hazard can be addressed. (DF #8)

Watershed and Aquatic Resources

Based on the "high" ranking for road density (miles of road per square mile), stream crossing density (number crossings per square mile) and intersect frequency (number crossings per mile of stream) within the Homestead Project Area, the following design features are intended to mitigate road surface runoff sediment transport to streams:

Design Features

1. For all in sloped roads with ditch, install rock check dams, constructed of 3 inches or greater angular rock within ditch, 50' above all perennial stream drain points and, rock ditch with 3 inches or greater angular rock from dam to drainage feature.
2. For all road/stream crossings, rock the road prism a minimum of 50' on the uphill and downhill approaches using 3 inches or lesser angular rock.
3. For all roads within 100' of a perennial stream, rock the road prism using 3 inches or lesser angular rock.

Best Management Practices (BMP) (Design)

1. Include all applicable Best Management Practices (BMPs) described in the Soil and Water Conservation Handbook (Forest Service Manual 2509.22)
2. Cut and fill slopes should be designed to match the natural hillslope topography to avoid instability.
3. On outsloped road cuts, with an active ground water expression, the implementation of a cross drain, French drain, and/or swale should be incorporated into the road design to prevent water pooling.
4. For temporary roads, all culverts should, at a minimum, accommodate a 25 year runoff event.
5. For permanent roads, all culverts should, at a minimum, accommodate a 100 year runoff event.
6. All culvert inlets and outlets should be armored with 3 inches or greater angular rock to prevent head cutting and/or piping.

Best Management Practices (Maintenance)

1. Drainageways should be cleared of all debris generated during construction and maintenance to prevent flow obstruction and water quality impacts.
2. The frequency of ditch cleaning would be limited to events when it is required to maintain ditch function. This limitation is intended to encourage stable ditch conditions through maintaining vegetation or rock lining in the ditch to the extent possible.
3. Unstable and erodible areas should be stabilized using seeding, compacting, rip-rapping, benching, weed free mulch, or other suitable method.
4. Established vehicle service and refueling areas and chemical storage sites should be located a minimum of 300ft. from wet areas and/or streams, using berms and dikes to contain any spills.
5. Incorporation of snow, ice, frozen soil, or organic material into road embankments should be avoided.
6. Runoff from concrete batching or aggregate operations should not be allowed to enter stream channels prior to treatment by filtration, flocculation, settling, or other acceptable methods.
7. Road maintenance activities should be postponed during periods of saturated road surfaces, heavy rainfall, or snowmelt.
8. Road palliatives take all necessary precautions to prevent the intrusion of these fugitive dust reducing chemicals into drainage features leading to streams.

9. The side-casting of materials into ditches, wetlands, or streams during road maintenance should be avoided.
10. During snow plowing operations, care should be taken to prevent damage to road surface, undercut slopes, or side-casting material into ditches, wetlands, or streams.
11. During snow plowing operations, breaks in snow berms should be provided to allow for adequate drainage and erosion prevention.

Sensitive Plants and Invasive Weeds

Sensitive Plant Species:

If threatened, endangered, or sensitive plant species are discovered during project implementation, an agency botanist will be notified so that appropriate site specific measures would be taken to maintain population viability. Measures to protect population viability and habitat for occurrences could include, but are not limited to:

1. Modifying activity methods to protect rare plants and their habitats or otherwise modifying the proposed activity,
2. Implementing buffers around plant occurrences.

Areas requiring revegetation (such as along road margins) would use native plant materials as required in FSM 2070.3 (Amendment 2008). Locally-obtained materials are preferred, but if unavailable or economically unfeasible, appropriate materials may be substituted that meet Region 1 guidelines.

Invasive Weeds:

1. The following measures would be taken to reduce the risk of invasive weed introduction and spread in accordance with the St. Joe Noxious Weed Control Environmental Impact Statement (Record of Decision, October 12, 1999).
2. Treatment would be implemented in accordance with priorities set by the noxious weed program if new populations of noxious weeds are found. New invader species would be slated for eradication immediately upon discovery. Other weed infestations would be treated according to direction in the St. Joe Noxious Weed Project Final Environmental Impact Statement and Record of Decision, and St. Joe Ranger District priorities.
3. Glyphosate would not be used to treat weeds in the project area.
4. Roads used for timber hauling would be treated with herbicides by the timber sale purchaser before timber haul begins and after timber haul is complete.
5. All equipment taken off roads (includes machinery used in restoration projects, and logging and construction equipment) would be cleaned prior to entering the project area to remove dirt, plant parts, and material that may carry weed seeds. A provision would be included in contracts.
6. Mulching would be done where deemed appropriate by the project administrator and botanist. On-site slash could be used. Contract provisions would be included in contracts.

7. After implementation, project areas would be monitored for new populations of noxious weeds. If new populations are found more intensive surveys would be conducted, sites would be mapped, and treatment would be scheduled.
8. Weed treatments would be monitored for effectiveness.
9. Provisions in the timber sale contract require the purchaser to seed and fertilize areas of soil disturbance such as those associated with skid trails, road construction, road cuts, and landings using a seed mix approved by an agency botanist at the time of contract preparation. Prior to any and all changes to the seed mixes and time of the seeding a district botanist would be notified to approve changes.
10. Weeds would be treated on existing roads to be stored or decommissioned if they are not brushed in prior to road storage or decommissioning.
11. All plant materials used in the project, including grass seed and mulch, would be certified noxious-weed free. Grass seed would be certified, blue-tagged seed.
12. Native plant materials are required to be used in restoration projects (FSM 2070.3, Amendment 2008). Locally-obtained materials are preferred, but if unavailable or economically unfeasible, appropriate materials may be substituted that meet Region 1 guidelines (Northern Region Native Plant Handbook, 1995).

Wildlife

Threatened, Endangered, Proposed, and Sensitive Wildlife Species Management

Contract provisions for the protection of Threatened, Endangered, Proposed, and Sensitive (TEPS) species and settlement for environmental cancellation would be included. If TEPS species or significant habitat are discovered before or during project implementation, the Sale Administrator and the district wildlife biologist would be notified so that measures could be taken to avoid impacts and meet Forest Plan Standards and Guidelines if needed. Measures could include altering or dropping proposed units, modifying the proposed activity, or implementing buffers. The district biologist should be notified if any TEPS species are observed during project activity.

Gray Wolf

Any active gray wolf den or rendezvous sites identified in or adjacent to proposed activity areas will be spatially or temporally buffered as appropriate. No project activities (excluding maintenance and hauling on year-round open road systems) will be allowed within one (1) mile of occupied sites, from April 1 through June 30 for den sites, and from July 1 through August 15 for rendezvous sites. Upon review by the Wildlife Biologist, these distances could potentially decrease based on topographical characteristics at each site.

Western Toad

All fish bearing streams would be buffered by 300 feet on each side. Perennial streams and wetlands larger than one acre in size are buffered from ground disturbing activity by at least 150 feet. Smaller

springs, seeps, and wetlands would be buffered by at least 100 feet if any are identified near or within harvest units.

Goshawks and Raptors

Nests**:** A no-activity area of 40 acres would be placed around any newly discovered goshawk nest or any nest that has been active in the past five years. If the nest tree is not roughly centered within the 40-acre no activity area, an additional no activity distance of at least 745 feet (the radius of a 40 acre circle) may be implemented between the nest tree and harvest units to reduce impacts to habitat around the nest site resulting from project activities. The District Wildlife Biologist would determine if this additional no activity distance would be implemented based on factors such as topography, the location of the nest tree within the 40-acre nest area, and the distance of the nest tree from privately owned lands or existing roads.

Post-Fledging Areas**:** Project activities would be suspended within the post-fledging areas from April 15 to August 15 to promote nesting success and provide forage opportunities for adults and fledgling goshawks during the fledgling dependency period. The units and road activities potentially affected by this design feature are subject to change year to year based on the location of active nests during the year the activities occur. Activity restrictions may be removed after June 30 if the District Wildlife Biologist determines that a particular nest site is inactive or unsuccessful.

Maintenance of landscape level connectivity and minimization of fragmentation was incorporated into the design of all alternatives included with timber harvest. Travel cover was identified and considered in terms of connectivity. Site specific design features for units with proposed vegetation removal in designated travel corridors can be found in Appendix E, Table E-2.

Big Game

The proposed road storage may require obliteration for a distance of 300 feet, a sight distance, or whatever distance is effective to eliminate motorized access. The amount and type of obliteration required would be the minimum needed to effectively prevent motorized vehicle use. This would vary depending on the slope and vegetation present. A guardrail barricade may be used if it can be placed to effectively prevent motorized access.

Existing gates would remain in place. Temporary gates would be installed on any road to be used that is not behind a gate, and is currently not drivable. During timber hauling, the gate would be closed and locked at the end of each day. For other operations, gates would be closed and locked after the passage of each vehicle.

Cavity Nesting Species

Recommendations for snag numbers and snag recruitment levels would be based on Forest Plan (2015) guideline FW-GDL-VEG-04 and are listed in the table below.

Table D 2: Recommended Snag and Snag Recruitment Levels to Retain (where they exist) after Vegetation Management Activities (including Post Harvest Activities), by Harvest Type (USFS 2015)

Dominance Group	Biophysical Setting	Snags > 15"+ DBH	Live Trees > 15.0" DBH
Ranges per Acre where Treatments Result in a Seed/Sap Size Class (Regeneration Harvest)			
All except lodgepole pine	**Warm/Dry**	2.0 – 4.0	0.5 – 3.0
	Warm/ Moist	4.5 – 6.5	1.0 – 5.5
	Subalpine	3.0 – 5.0	1.0 – 3.5
Lodgepole pine	**All**	1.0 – 2.5	0.5 – 3.0
Ranges per Acre where Treatments Result in a Small or Medium Size Class (e.g., Commercial Thin)			
All except lodgepole pine	**Warm/Dry**	2.0 – 5.0	20.5 – 32.5
	Warm/Moist	4.0 – 6.5	26.0 – 34.0
	Subalpine	3.0 – 5.0	20.0 – 25.5
Lodgepole pine	**All**	1.0 – 3.5	11.0 – 19.0
Ranges per Acre for Treatments in the Large Size Class (e.g., Restoration)			
All except lodgepole pine	**Warm/Dry**	2.5 – 6.0	19.0 – 32.5
	Warm/Moist	6.0 – 12.5	32.5 – 47.0
	Subalpine	4.5 –11.5	23.0 – 45.0

Snag Guidelines under **FW-GDL-VEG-05 & 06**

- Group snags where possible;
- Retain snags far enough away from roads or other areas open to public access to reduce the potential for removal (generally more than 150 feet);
- Emphasize retention of the largest snags and live trees as well as those species that tend to be the most persistent, such as ponderosa pine, larch, and cedar;
- Favor snags or live trees with existing cavities or evidence of use by woodpeckers or other wildlife.
- During vegetation management activities (for example, timber harvest), and in the event that retained snags (or live trees being retained for future snags) fall over or are felled (for safety concerns), they should be left on site to provide coarse woody debris.

Small Mammal Habitat

In harvest units where slash piles are created, one pile per 5 acres would be left unburned to supply potential forest carnivore rest sites, provide cover for small animals (prey habitat), and serve as potential den sites (IDFG 1995). Piles left should be those closest to standing timber, such as the unit edge or a large cluster of leave trees.

Heritage

1. Directionally fell trees away from sites in areas where eligible sites are located.
2. If during project activities cultural material or human remains are encountered, all work will cease immediately, and the zone or forest archeologist will be contacted and the approved Region 1 "Unanticipated Discovery Plan and Discovery of Human Remains Protocols" (Plan) will be implemented. A mitigation plan, if needed, will be developed in consultation with the SHPO and federally recognized tribes of interests if appropriate.
3. All cultural resources (including the unanticipated discovery of any historic or prehistoric era sites) Including buildings, trails, mining or logging camps and chutes, and all other heritage properties that would be protected by avoiding, buffering, or mitigating impacts to those resources. The implementation plan will include a buffer of no less than 50 feet around known historic properties determined to be eligible for the NRHP.
4. All slash piling, either by hand or ground-based machines, will occur outside of eligible cultural resource boundaries. If burning of slash is necessary, within site boundaries, the project lead must check with an Idaho Panhandle National Forests archaeologist prior to implementation for concurrence regarding historic sites, rare isolates, features, or a combination of these things. All eligible and potentially eligible (unevaluated) historic properties with structural remains or other combustible feature types will be avoided or protected during all burning activities.
5. All landings and other staging areas, skid trails, and areas utilized for project operations will not be located within 100 feet of known eligible cultural resources. Landings placed outside of harvest units will be assessed by an Idaho Panhandle National Forests archaeologist prior to implementation.
6. Any changes to the proposed action that may occur during layout or implementation would be reviewed by an Idaho Panhandle National Forests archaeologist, and if necessary, a cultural resource survey would be conducted prior to project implementation. Newly documented heritage properties would be evaluated, with specific protection measures put into place to protect the eligibility status of that property. Such measure could include dropping units from harvest activity; modifying unit boundaries to provide adequate buffers around documented eligible properties, as determined by a qualified archaeologist; and/or modifying harvest methods.
7. On Marble Creek Certain entry/exit points will be established for machinery to avoid eligible/unevaluated cultural sites. Due to the density of sites in this area, a map will be provided prior to implementation denoting areas of avoidance, and entry and exit points within the Marble Creek restoration corridor.

Scenic

- Treatment unit boundaries would resemble the shape of natural openings in the surrounding area, would not be symmetrical in shape, would avoid right angles and straight lines, and would follow natural topographic breaks and changes in vegetation.
- Locate temporary roads U13Temp, U14Temp, U20Temp, U21Temp, U21Temp2, U25Temp, U26Temp, and U28Temp so as to take advantage of topographic and vegetation screening as feasible. These temporary roads will be fully recontoured and reseeded once operations are completed.
- Dispose of slash piles as soon as possible after they are generated. Where slash piles are visible in the foreground of Forest Road 321, ensure 95 percent consumption of the piles, even when this may mean re-piling and re-burning. Scattering slash that has not be consumed by burning is also acceptable.
- Minimize cuts and fills associated with road and landing construction, and recontour and reseed temporary roads, landings, and slash piles when harvest activities are completed.
- Units 30, 31B, 32A, 32B, 33, 34, and 35: Break up the created openings resulting from treatment in these units using groups of leave trees to provide vertical structure within the harvest area and break up the opening. These would be both live and dead trees emulating the same structure that would remain after a natural mixed-severity wildfire. These leave trees would have an irregular or uneven distribution and can range from individual trees to groups of trees up to 3 acres in size and may also include leave areas adjacent to unit boundaries.
- Units 30, 31B, 32B, 34, and 35: Retain adequate trees to minimize the visibility of the existing roads within these units as seen from Forest Road 321 south of the project area.
- Units 1A, 1B, 2A, 2B, 5A.4, 12, 13, 14, 20, 21, 22, 25A, 25B, 26, and 28: Retain trees along FR 321 to break up views into these units. This can be accomplished through concentrating some of the reserves near the road frontage. It may also require additional trees or groups of trees to provide a natural-appearing partial screen as seen from the road.
- Feather all unit boundaries visible from FR 321 in immediate foreground, foreground, middle ground viewing distances.
- Units 1A, 2A, 12, 13, 14, 20, 21, 25A, 25B, 26, and 28: Use marking methods (such as ¾ banding and reduced line lengths on boundary trees) designed to minimize the visibility of leave tree and boundary marking paint following project completion as seen from FR 321.

Soils

1. For any units harvested in the winter, equipment will operate on 12 inches of settled snow, or frozen ground. Units 1A.1, 5A.1, 5A.2, 5A.3, 20, 21, 22, 23, 25A and 34 are required to be harvested in the winter in order to prevent cumulative DSD that exceeds the soil quality threshold.

2. Suspend operations under wet or thawing conditions.

3. Heavily impacted skid trails and landings will be required to be decompacted or scarified following ground based harvest and fuel reduction activities, in order to reduce compaction and potential for erosion. For those heavily impacted existing skid trails that are not used during the course of the timber project, other funding mechanisms will be used to decompact and promote soil rehabilitation. Units for which supplementary rehabilitation efforts may be needed to maintain site productivity and function are 1A, 20, 21, 22, 23, 25A, 26, 28, 2A, 34, 5A.1, 5A.2, and 5A.3.

4. Machinery should avoid excessive pivoting in order to prevent soil displacement.

5. Coarse woody debris would be retained on the ground for sustained nutrient recycling in harvest units, consistent with FW-GDL-VEG-03 and FW-GDL-SOIL02.

6. Ground-based equipment (including grapple piling equipment) should only operate on slopes less than 40 percent, in order to avoid detrimental soil disturbance. Where slopes within an activity area contain short pitches greater than 40 percent, but less than 150 feet in length, ground-based equipment may be allowed, as designated by the Timber Sale Administrator.

7. Existing skid trails would be used where possible. All new skid trails would be designated and laid out to take advantage of topography and minimize disruption of natural drainage patterns. Where terrain is conducive, trails would be spaced at least 100 feet or more apart. There is a subset of units in which it is required to reuse a minimum amount of the existing skid trails in order to meet the regional soil quality standards. While unit specific details can be found in the project file, the units that would approach DSD threshold values if the skid trail reuse recommendations are not adhered to are as follows; 20, 21, 22, 26, 28, and 34. The soil scientist or timber sale administrator will need to work with the purchaser in order to ensure regional soil quality standards are being met.

8. Where material is available, ground disturbance associated with skid trails would be covered with randomly placed logs (on the contour), slash, or seeded with Forest approved seed mix to help increase the microtopography needed to reduce runoff and erosion.

9. When grapple piling, equipment will restrict operations to the existing skid trails wherever possible, particularly in units expected to be on the threshold for detrimental soil disturbance. In instances where grapple piling outside of the existing skid trails is necessary to meet fuels objectives, equipment would utilize the reach of the boom to the extent possible, avoid unnecessary pivoting, and restrict operations to 2 passes over any given area.

10. Equipment shall not be operated when ground conditions are such that excessive damage will result.

11. The leading end of logs would be suspended during skyline yarding.

12. No yarding across designated Riparian Habitat Conservation Areas would occur with this project.

13. All temporary roads and excavated skid trails would be rehabilitated (all new construction would be recontoured; existing prisms would be placed in a stable condition through recontouring and/or decompaction).

14. Prescribed burning (ex. pile burning, broadcast and underburning) would occur only when the upper surface inch of mineral soil has a moisture content of 25 percent by weight, or when duff moisture exceeds 60 percent, or when other monitoring or modeling indicates that soil productivity will be protected.

15. Burn piles would be small and numerous rather than large and few.

Recreation

The following design features have been incorporated into the proposed action to minimize effects to motorized recreation and dispersed recreation opportunities.

1. Existing dispersed camp sites impacted by harvest activities or road modifications should be restored or reconfigured to provide a similar space for dispersed camping. See project record for Homestead Dispersed Recreation Opportunities map.

2. Plowing of groomed routes should only occur before December 15 or after March 15 to allow for grooming of motorized snow routes. Should plowing be necessary between December 15 and March 15 an area should be plowed to provide for parking at the end of the plowed route. See project record for Homestead Groomed Snow Routes map.

Appendix E- Past, Ongoing and Reasonably Foreseeable Activities

This appendix provides information about relevant past, present and reasonably foreseeable projects or activities within the project area. A synopsis of past management activities in the entire project area is provided in the table below, followed by more specific information about those activities.

Table E 1: Synopsis of Past, Ongoing and Reasonably Foreseeable Activities

Activities	Past	Present	Reasonably Foreseeable	Notes
TIMBER MANAGEMENT				
Timber harvest and related activities on NFS lands	X			
Precommercial thinning/timber stand improvement on NFS lands	X		X	
Tree planting on NFS lands	X			
White pine pruning				
Gopher control baiting on NFS lands	X			
Splash dams, for log transport	X			
Stream channelization for log transport	X			
FIRE/FUELS				
Prescribed burning for site preparation and fuels treatments	X		X	
Wildfires	X	X	X	Reasonable to assume fire ignitions will occur now and in the future in the project area
Fire suppression	X	X	X	Project area lie mostly within MA6 where fires are suppressed.
Fire managed for resource benefit		X	X	Potential for managed natural ignitions in some portions of the Homestead project area on the south end—MA5, backcountry.
TRANSPORTATION				
Travel Plan implementation	X			
Road construction	X			

Activities	Past	Present	Reasonably Foreseeable	Notes
Road decommissioning	X			
Road maintenance	X			
Trail maintenance	X	X	X	
Use of motorized vehicles (full-sized, ATVs, motorcycles)	X	X	X	
RECREATION				
Public use of motorized vehicles (on roads, trails, over snow)	X	X	X	
Public firewood gathering	X	X	X	
Camping, snowmobiling, hunting, hiking, berry picking, fishing, Christmas tree cutting, mountain bike riding	X	X	X	
OTHER ACTIVITIES				
Herbicide spraying for noxious weeds	X	X	X	
Gravel pit development	X			

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